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IN THE

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM—1965

No. 55

THE UNITED STATES OF AMERICA,
Petitioner,

vs.

BERT N. ADAMS, EMMA ADAMS, GEORGE HALLINGBY (individually and as Executor of the Estate of Olaf Hallingby, deceased), JANE MAESEL, IRIS PETRY, LEWIS M. SCHOTT, MARY ELLEN HALLINGBY SEIMERS, and HELEN LOUISE SUTCLIFFE (individually and as Executrix of the Estate of Ernest M. Sutcliffe, deceased),
Respondents.

RESPONDENTS' BRIEF

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RESPONDENTS' BRIEF

Respondents respectfully pray that the Government's Petition for a Writ of Certiorari herein be dismissed or that the decision of the lower Court be affirmed (R. 689; 330 F2d 622).

Jurisdiction

On May 2, 1960, Adams[1] brought this suit in the Court of Claims on two counts, one for patent infringement and the other for breach of contract.

On April 17, 1964, the Court of Claims rendered a final judgment holding the Adams patent valid and infringed and declined to decide the breach of contract claim (330 F. 2d 622, 624).

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[1] The eight respondents are hereinafter collectively referred to as Adams and the United States of America is referred to as the Government.

Neither side objected to this final judgment on the patent claim, petitioned for a rehearing on the subject, filed a petition for certiorari, or an application for an extension of time to file such a petition until the Government did so on January 14, 1965, nine months later.

On January 21, 1965, the Government's time to petition was extended until February 13, 1965. The Government did not serve its petition until February 16, 1965.

The Jurisdiction of this Court under 28 U. S. C. § 2101 (c) is in issue.

Statutes Involved

In addition to the Statutes cited by the Government in its Brief (pp. 2-4), this case involves:

Title 28 of the United States Code which provides in pertinent part:

> "**§ 2101. Supreme Court; time for appeal or certiorari; docketing; stay**
>
> * * *
>
> "(c) Any other appeal or any writ of certiorari intended to bring any judgment or decree in a civil action, suit or proceeding before the Supreme Court for review shall be taken or applied for within ninety days after the entry of such judgment or decree. A justice of the Supreme Court, for good cause shown, may extend the time for applying for a writ of certiorari for a period not exceeding sixty days."

Questions Presented

1. Was the application for an extension of time to file a petition for certiorari applied for within the period allowed by law? 28 U. S. C. § 2101(c). This Brief, p. 84.

2. Was the petition for certiorari taken or applied for within the extended period of time granted to the Government? This Brief, p. 86.

3. Should not the petition be dismissed because the Government has reversed its position on a question of fact in order to seek a reversal of the lower Court's decision which the Government itself induced the lower Court to make? This Brief, p. 88.

4. Was not the ruling of the Court below, holding the Adams patent valid, in full conformity with the applicable decisions of this Court applying the constitutional and statutory standards of invention? This Brief, p. 3.

Statement of the Case

The testimony before the Commissioner proved what the battery art knew and understood from the history of the prior art introduced into evidence by the Government and *Adams*. The Government, in its opening brief before this Court, refers to that testimony *once*, in a footnote. (Govt. Brief, p. 5). Because the history of the prior art serves to emphasize rather than to discredit the striking advance made by Adams, it is incumbent on Adams to set forth what was proven at the trial, since the Government does not do so.

The Record at the Trial

This case concerns the first basic scientific advance in batteries in almost a century and a half.

Batteries[2] were invented in 1800 by Alessandro Volta (PX-42, R. 499, 281; R. 136-7). His batteries provided science and industry with the first practical source of electricity. When Volta discovered the battery, he also discovered and explained the scientific principles on which all subsequent batteries for almost a century and a half have been based (R. 217; PX-42, R. 499, 281).

In 1940 Adams invented the first device that produces electricity by an electrochemical process but does not respond to Volta's theory (R. 264, 695), or indeed any known theory (R. 262-4, 695; PX-40, R. 491-2, 264; PX-41, R. 495-6, 264). The components of the Adams battery were never assembled before [3] (R. 382-3, 704) for the excellent reason that the art "knew" they could not work in a battery (R. 264, 217). The Adams battery functions in an opposite manner to the conventional Voltaic battery (R. 217, 257, 206-7, 704).

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[2] This case concerns primary batteries, i.e. the type that cannot be recharged. In primary batteries, all of the available electrical energy is stored in the battery when it is assembled.

[3] As the Government admitted in its petition (p. 11).

A. The Conventional Voltaic Battery vs. The Adams Battery in Function

Batteries prior to 1940 had serious limitations which the science had sought to overcome, but which seemed insurmountable. Among such limitations were:

1. Conventional batteries delivered only *intermittent* power effectively (R. 217, 115, 118). They could not be used continuously because such use shortened their life to impractical limits (R. 217). At the trial, such batteries were referred to by both sides as "bell-ringers" because they were not capable of effective use except at spaced intervals (R. 145, 132, 370).

2. Conventional batteries delivered power that *declined* over each period of use (R. 217). They could not provide the *level* electrical power that an electric generator can provide (R. 145, 115; PX-38, this Brief, p. 51, R. 228). Thus, a conventional battery cannot effectively power for any prolonged period ordinary electric devices, such as motors, ignition systems, floodlights, beacons, radio sending and receiving sets or any high demand electrical equipment, all of which require *level* power to function effectively (R. 115, 199-200, 210, 292-3; PX-18, R. 454, 458, 87; R. 440).

3. Conventional batteries produce electricity by what is essentially a chemical process. When subjected to low temperatures that process slows down (R. 209, 119). When conventional batteries are subjected to extreme cold they produce less and less electricity, and if the temperature is low enough, the battery stops producing entirely (CX-2c, R. 445-6, 11; R. 209, 119). The *art had no tools* to overcome this low temperature problem (R. 261), thus conventional batteries are ineffective in very cold weather, in the arctic, in space and the stratosphere where temperatures fall to –60° below zero.

The Adams battery solved *all* of these problems. The Adams battery provides *continuous* power efficiently (R. 114-5, 118, 145, 217; PX-38, this Brief, p. 51). The Adams battery provides *level* power efficiently (R. 145-6, 111, 112-3, 115, 205-6; PX-38, this Brief, p. 51). The Adams battery provides efficient power at all temperatures down to –60° below zero (R. 68, 114, 145, 209, 258-260; TX-2, R. 390, 10; PX-19, R. 459, 88). Moreover, it will do all three simultaneously, without loss of efficiency (R. 112-115, 118-9, 144-6,

704). This is something *no other* battery can do (R. 209, 119) even today, twenty years later (R. 209).

The initial reaction of conventional Voltaic battery experts to these characteristics of the Adams battery was one of disbelief. When Adams first disclosed his battery to the Army's battery experts at Ft. Monmouth in 1942, they could not believe that the battery could produce power continuously. Rather they said that the battery was destroying itself by "running away" (R. 216-8). Only Adams had the vision to comprehend that this was the first battery to provide an effective source of continuous power (R. 68-9). Now the same experts agree with Adams (R. 157; TX-2, 390, 10; R. 212; PX-16, 448, 84; CX-2a, R. 439, 8). Adams batteries have been built that gave days of continuous power at voltages up to 1000 volts (CX-2a, 440, 8).

Nor could the Army battery experts believe that the Adams battery could produce level power. They knew that the batteries they were familiar with produced current which declined over each period of use (R. 216-7). Indeed the voltage and amperage curves of conventional batteries decline dramatically under continuous use (PX-38, this Brief p. 51). This is understandable, for as the chemical components in a battery are used up in the process, it is to be expected that it will produce less and less power.

The voltage and amperage curves of the Adams batteries are mathematically level (R. 226-7; TX-15, R. 419, 413; R. 145, 205, this Brief, p. 51). The experts could not believe this to be correct and said Adams did not know how to plot a curve, for his curves looked as if they were "drawn with a ruler" (R. 218; TX-15, R. 419, 413). But Adams was proven right again (R. 214, 111) for the published curves of the Adams type batteries the Government now procures all look as if they were drawn with level rulers (CX-2c, R. 446, 8; PX-16, 450, 84; R. 214; PX-37, 465, 202; R. 198). This characteristic of providing *level* power *continuously* makes it possible for the Adams battery to effectively power a whole host of scientific and commercial electronic equipment which has never been previously adequately powered by battery (R. 115-6, 199, 210-11, 292-3; PX-18, R. 458, 87; CX-2, R. 440, 8; R. 704). There is no known scientific explanation for this level delivery of power (R. 208, 695).

The Army battery experts also refused to believe or understand the low temperature capability of the Adams battery. This is also understandable, for in operation, the

Adams battery generates great quantities of heat and often boils, which rather than destroying it as occurs in all conventional batteries (R. 217, 260; PX-16, R. 450, 85), actually provides a source of self-generated heat which permits this battery to operate with unreduced efficiency in space, or in the arctic, at temperatures almost 100° below the freezing temperature of the water with which it is activated (R. 114, 68; PX-19, R. 459, 88; R. 260-1; CX-2c, R. 446, 8; R. 704). On ... Adams understood this and recognized the utility of thi... eration of heat (R. 68, 77). The Government's experts told Adams that his battery was inoperative because it "overheated" (R. 77, 68, 216-7; PX-16, R. 450, 85; R. 213-4, 704), but they now agree that it is this same exothermic reaction which gives the Adams battery one of its most important advantages, extreme low temperature operation (PX-16, R. 449-50, 85; R. 213-4; R. 216; PX-37, R. 466, 202; R. 199-200; TX-2, R. 390, 10; PX-19, R. 459, 88). For this reason the Adams battery has now swept the fields of low temperature use and high altitude meteorological research (CX-2c, R. 445, 8; CX-2b, R. 442, 8; TX-2, R. 390, 10; CX-2a, R. 439, 8; R. 257-9; PX-37, R. 463, 202). It is used by the Government to assay weather conditions in the stratosphere and beyond, where there is practically no atmosphere and the temperature falls to –60° below zero (*Ibid.;* PX-19, R. 459, 88). Statements published by the Government say the Adams battery is "unsurpassed" under these conditions (R. 254-7; CX-2, R. 439, 8). It operates where conventional batteries freeze (R. 259; CX-2c, R. 445-6, 8).

Thus, the Adams battery functions in a manner completely different from any prior art battery (R. 209; 216-7) and produces results completely different and opposite from those that any other battery had ever before produced (R. 145-6; 119; 209). These new results were unexpected,[4] highly useful,[5] unbelievable,[6] and unbelieved at the time.[7]

The unusual functions and characteristics of the Adams battery fit it for tasks no other battery can adequately perform (R. 692, 704, 115, 199-200, 210, 292-3; PX-18, R. 454, 458, 87; CX-2, R. 439, 440, 445, 8; R. 259).

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[4] (R. 694, 695; 206-9; TX-15, R. 416-7, 413; R. 199-200).

[5] (R. 692, 704, 210-11, 114-5, 115-6; CX-2, R. 439, 440, 442, 445, 8; PX-18, R. 454-8, 87-8; TX-2, R. 390, 10).

[6] (R. 206-9, 216-18, 704).

[7] (R. 68-9, 77; PX-16, R. 450, 85; R. 216-9, 206-9, 704).

The Adams battery has come to be recognized as an extremely important step by masters in the field of electrochemistry and to be a distinctive contribution to scientific knowledge and the useful arts (R. 692, 217, 206-9, 199-200, 114-9; TX-2, R. 390, 9-10; PX-40, R. 491-2, 264; R. 262-4; PX-19, R. 459, 88; CX-2, R. 439, 440, 445-6, 8; PX-18, R. 454-8, 87). It has made possible advances which would otherwise have not been feasible according to statements in Government publications made *ante litem motam*. In such publications, the Adams battery has been heralded by leading scientists in the field as "unsurpassed" (CX-2, R. 439, 8), "extremely important to the Military" (CX-2, R. 439, 8), "helped immensely in rounding out the sources of battery power" (CX-2, R. 440, 8; R. 704) and "brought about developments which would otherwise have been technically or economically impractical" (CX-2, R. 440, 8; R. 692). According to statements published by the Government, the Government has procured over a million of these batteries for meteorological use alone (CX-2c, R. 445, 8) and in so doing has saved itself over five million dollars (R. 256).

As a result of all the foregoing, the lower Court properly found:

> "23. The Adams invention was the first practical, water-activated, constant potential battery capable of operation at low temperatures. When Adams first disclosed his invention to others skilled in the art, he did not know its theory of operation and it was received with considerable skepticism. However, this development was subsequently recognized throughout the industry as an extremely important step in rounding out the sources of battery-furnished power, and filling important, long-standing needs of both civilian and military natures." (R. 704)

B. The Conventional Voltaic Battery vs. The Adams Battery in Composition and Theory

Volta taught the world that batteries must consist of three elements, the two metallic electrodes and the liquid electrolyte with which the battery is filled (PX-42, R. 499-501, 281; R. 217), and that each of these *must* be a good conductor of electricity (*Ibid.*). Since 1800, all conventional Voltaic batteries have consisted of three such good con-

ductors. At the trial, the prior art showed that Volta had tried water as an electrolyte in his first battery experiments and rejected it (PX-42, R. 500-1, 281) because he found it to be a poor conductor (*Ibid.*). In fact, plain water is an insulator (R. 264, 120), and will not conduct electricity. The testimony showed that the art has known since 1800 that plain water could not be successfully used as an electrolyte in a battery and successive failures in the interim reenforced that knowledge (This Brief, pp. 45-6).

The art also knew that magnesium, which since 1880 had often been suggested for use in batteries because of its high electromotive force (R. 360-1) could not be successfully employed in conventional batteries because of its "corrodibility" or destruction by conventional electrolytes (This Brief, pp. 42-44, 64; R. 243, 295; DX-12, R. 565, 381; R. 363, 388; PX-39, R. 467, 8). The Government's prior art shows that it was recognized in 1928 that "magnesium could not be commercially utilized as a primary cell electrode" (DX-12, R. 565, 381). A 1937 patent, that ostensibly taught how to use magnesium in a battery, was inoperative (DX-14, R. 572, 381; R. 388). This situation prevailed through 1940 as the art cited by Adams showed (PX-39, R. 467, 251; R. 243) and as the Government's expert admitted (R. 362).

The art also knew that cuprous chloride, which in mixtures with other materials, had been suggested for use in batteries several times between 1880 and 1895 (DX-18, 19, 20, 21, R. 589, 591, 597, 601, 381), often produced disastrous results when employed in batteries (R. 388, 703) and was also destroyed by conventional acid or basic electrolytes (DX-18, R. 589, line 97—R. 590, line 8, R. 381). There is no evidence that any practical battery had ever been made employing it (This Brief, p. 44).

The invention claimed in the Adams patent is a battery comprising (a liquid container), a magnesium electrode and a cuprous chloride electrode (with or without carbon) (R. 395, 701-2). This combination is specifically novel (Find. No. 22, R. 704), and defines the battery as it is manufactured, distributed and sold. No prior art battery had this combination (R. 704). The Government so admitted in its Petition (p. 11). The Government batteries all respond to the claims of the Adams patent (R. 707-8), and no question of infringement was raised by the Government in its petition. The Adams patent teaches that the claimed combina-

tion is to be activated with water (R. 704; TX-10, R. 393, 394, lines 13-14, R. 11). The Government batteries are all activated in this manner (R. 156-7).

One may well ask how these substances all work in the Adams battery, if they never worked before, even singly. The answer is *no one knows* (R. 263-4, 695). But the record does disclose how Adams arrived at his invention.

Adams fundamentally disbelieved Voltaic theory and his original thinking in the field of electrochemistry coupled with two years of experimenting day and night led him to the discovery of his battery (R. 40-53, 106-7, 698). Conventional theory taught that water could not function as an electrolyte in a battery because it is an insulator (R. 217). Adams agreed water was an insulator (R. 40-1) but *believed* that only a non-active chemically neutral liquid like water could solve the problem of employing highly corrodible magnesium in a battery (R. 40, 49). Thus, for his purposes water was "a good electrolyte" (R. 41). However, conventional theory taught that magnesium was insoluble in water (R. 264) and therefor could not chemically react. Adams *believed* that magnesium was soluble in water and therefore that water and magnesium could react (R. 41). Conventional theory taught that cuprous chloride was also insoluble in water (R. 121, 264) but this did not deter Adams from experimenting with it in conjunction with magnesium (R. 41).

By dint of intensive experimentation and study (R. 40-53, 106-7) Ber[illegible] N. Adams, with the help of his wife, discovered that when cuprous chloride was used in combination with magnesium and the battery activated by water the result was a new electrochemical system (R. 206-7, 216-7, 209, 253, 257, 264; PX-18, R. 454, 87; R. 119, 41, 698-9, 704). In 1940, after accidentally dropping cigarette ashes into the cuprous chloride which he was making into a cathode, Adams divined that it was the carbon in the ash that greatly improved the performance of the cathode and resultant battery (R. 43-5, 106, 698). Thus, as events proved, Adams invented the first practical, water-activated battery capable of producing *continuous* power at a *constant* level even *at extremely low temperatures* (R. 112-115, 118-9, 144-6, 209, 698, 704).

Adams combined components for his battery, each of which individually had been tried and discarded by the battery art over 50 years earlier (R. 264, 382, 692, 704). No one

before had ever put the combination together[8] (*Ibid.*), or suggested that the combination should be put together or could be an operative battery (R. 216-7; 209; PX-16, R. 410, 85; R. 704).

A man skilled in the art[9] has testified that it was ridiculous for Adams to expect that the components he combined in his battery would be operative or function as a battery (R. 264-5, 206-9). Conventional Voltaic theory indicated it must fail (R. 217, 695). No one knows how or why it does operate (R. 263-4, 695). When Adams first made his battery there was no scientific theory or explanation that would predict its operation (R. 263-4). There was no scientific theory that would explain its operation (R. 262-5, 217). Even today the theory upon which the Adams battery operates is unknown (R. 263-4, 695, 704).

As a result of the foregoing, the Court below properly found:

> "22. Each of the elements of the several claims of the Adams patent was individually old in the battery-making art at the time of the filing of the Adams application for the patent here in suit. While there is evidence of a definite need for a battery having the characteristics of the Adams battery, those skilled in the art failed to develop one for a period of over 50 years, during which time all of the necessary ingredients were available. There is no evidence that [fol. 969] anyone had ever before suggested the specific *combination* of elements which make up the Adams battery nor that anyone had ever before suggested that such a battery would have a substantially constant potential, could be operated under extreme temperatures, and could be operated with ordinary or distilled water." (R. 704).

C. Adams and His Contacts With The Government

When Adams entered the scene in 1939, he was self-taught in the field of electrochemistry (R. 40, 105). He

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[8] The Government has admitted all along they were never put together before. In its Petition, p. 11, the Government stated "It is true that Adams put together elements not actually combined before and obtained more favorable results, for some purposes, than had prior combinations."

[9] This was Adams' expert, Dr. Mantell, who was described by the Government as a "very renowned electrochemist." (R. 147)

experimented night and day for two years before he discovered his battery (R. 40-53, 106-7). He had no research laboratory and conducted his experiments with his wife's help in his home (R. 44, 105-7, 81). The batteries that he made for himself and for the Government were constructed on his kitchen stove (PX-17, R. 453, 85; R. 105, 68, 69, 70, 71, 75, 76, 77, 78, 80, 81, 82). His triumph over these conditions is a tribute to his inventive genius and the indomitable character of the human spirit.

Adams applied for the patent in suit shortly after Pearl Harbor (R. 393). He had received copies of two publications of the National Inventor's Council of the U. S. Department of Commerce requesting inventors to come forward with inventions that might be helpful to the war effort and promising compensation by the Government for disclosures that were used (R. 8; TX-13, R. 408-12, 8) and he promptly wrote to the National Inventor's Council on January 7, 1942 (R. 2, 59, 72-3; TX-15, R. 415, 413), the Navy on January 8, 1942 (R. 60) and the Army Signal Corps on January 10, 1942 (R. 60-61) and then went to Washington to offer his battery in person (R. 61).

It is astonishing that Adams, a tyro, could recognize and comprehend all the unusual electrochemical characteristics and potential uses of his battery, but he did. All the new characteristics of his battery were stated in the Adams patent and all the new characteristics and potential uses were divulged to the Government by Adams on January 7, 1942 in writing (TX-15, R. 415, 413).

In Washington, from January 21-24 of 1942, he had an extensive four day conference at the Navy Department (R. 413, 61, 63). He was then directed to the Army's Experimental Battery Center at Ft. Monmouth, New Jersey (R. 62-5) where he met many battery scientists, including Drs. Adolph Fischbach and Hyman Mandel (R. 67, 428).

At a series of meetings held periodically at Ft. Monmouth during 1942 and 1943, Adams described his battery to these Government experts, including Drs. Fischbach and Mandel (R. 63, 65, 66, 67, 68, 69, 70, 71, 75, 76, 77, 78, 80, 81, 82, 51, 53). He told them how it worked and what it would do (R. 66, 75, 77). He informed them not only that cuprous chloride worked as his patent taught (R. 66) but also that silver chloride was operative (R. 66) which his patent did not mention (R. 694).

At the request of the Army experts, who helped him get the necessary magnesium when he ran out, Adams made and delivered many batteries to them for test during 1942 and 1943 (R. 63, 65-70, 77-8, 80-1, 433, 432, 427, 421, 435). It is stipulated that a minimum of 14 batteries were delivered (R. 10). The Record shows at least 26 were delivered (R. 63-84). The experts complained that the batteries overheated (R. 68, 77) but admitted they showed level power delivery (R. 66, 67). Adams explained to them over and over that it was the so-called "overheating" that permitted his battery to operate at extremely low temperatures (R. 68-9, 77). They did not agree (R. 214, 68, 77; PX-16, R. 450, 85; R. 217, 704) but now they admit he was right (PX-16, R. 449-50, 85; R. 213-4, 216; PX-37, R. 466, 202; R. 199-200; TX-2, R. 390, 10).

Although he was promised the contrary by high authority including the Chief of the U. S. Signal Corps (R. 434, 74, 73) and although he saw Dr. Fischbach as late as 1948 (R. 84), neither Fischbach nor the other Government experts at Ft. Monmouth would ever reveal to him the results of their tests on his battery (R. 71, 74, 81, 82, 83).

The record shows that when the Adams battery was first disclosed and demonstrated to these Government experts at Ft. Monmouth they initially stated that they did not believe it would work (R. 68, 77, 216; TX-12, R. 401, 11; PX-16, R. 450, 85), but later they decided they were wrong (PX-16, R. 450, 85; TX-2, R. 390, 9-10).

The record of the internal Government correspondence shows that the Government secretly confirmed that Adams claims were correct and that his battery was operative. This was proven by the work of Dr. William Shorr, an employee at Ft. Monmouth (R. 218-9; TX-12, R. 404-6, 11) and by work at the Naval Research Laboratory by T. P. Dirkse[10] from 1943 to 1945 (R. 236-238). This work also confirmed that an operative magnesium-cuprous chloride battery with all the new characteristics Adams had stated, could be produced simply by following the instructions in the Adams patent, but any variation from the Adams patent was a failure (R. 218-227).

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[10] Dirkse's report went to Dr. White, who later turned up as the Government's expert in this case (Please see CX-4, unprinted).

Dr. Fischbach began to take an interest in the Adams battery in 1946 (PX-16, R. 450, 85) although he never admitted this to Adams in 1948 (R. 83-4).

In 1953, ten years after Adams disclosure of his battery to them, Drs. Fischbach and Mandel received a U. S. Patent covering this same magnesium, cuprous chloride battery (R. 157; TX-2, R. 390, 9-11). This patent pays tribute to the scientific achievements of this new battery system (TX-2, R. 390, 9-10). This patent is now *owned by the Government (Ibid.)*. It has never been disclaimed, it is still viable.

The Adams patent was cited against the Fischbach patent application in the U. S. Patent Office, but, of course, the U. S. Patent Office did not know anything of the details of the past transactions between Fischbach and Adams. Fischbach received his patent by alleging that his electrode was more "porous" than Adams (TX-2, R. 391, 9-10). However, a Government expert at the trial testified that the electrode of Adams could be made as porous as desired (R. 333) by using carbon as Adams taught. This was confirmed by Adams expert, Dr. Mantell (R. 301).

Neither Dr. Fischbach nor Dr. Mandel testified at the trial, although they are both still employed at Ft. Monmouth (R. 305).

D. Infringement

The Government, in the "Statement" in its Brief, attempts to interject the question of infringement, a matter as to which it has not sought review (Pet. p. 2).

At Brief pages 4, 5 and 6, in footnotes and argument, the Government attempts to show that the Adams cuprous chloride is "fused", while the Army cuprous chloride is "pasted" (Govt. Brief, p. 4, 6), that the claims of Adams are limited to "fused" (Govt. Brief p. 5). That the Adams battery consists of a glass jar (Govt. Brief p. 4) while the Army battery is in a wax box and has "bibulous" separators between pasted pellets (Govt. Brief p. 6) and is the result of "extended experimentation" to improve the "impractical" Adams battery (Govt. Brief p. 6).

The Government does not tell the Court that both the Adams and Government battery electrodes are made by melting the cuprous chloride powder and pouring it to make the electrode (R. 120-3, 125, 325-6, 706-7). Adams

melts with heat (R. 122, 125) the Government with water (R. 121-2, 325-6). There is no difference between them (R. 138, 706-7). Both methods were old in 1880, according to the Government's own proofs (R. 270). The Government does not tell the Court that the Government battery is a pile type battery and the battery shown in the Adams drawing and example is a cup type battery and both types were disclosed by Volta in 1800 (R. 136-7; PX-42, R. 499-501, 281).

The Government does not tell the Court that there is not one word of testimony in the record concerning any extended experimentation by the Government, but that the documents produced by the Government show that it spent three years trying to design around the Adams patent and *failed* (R. 218-9; TX-12, R. 404-6, 11; R. 236-8; R. 218-227) and that a successful Adams battery was made by a Government researcher on *the first attempt,* following only the Adams patent (R. 218-9).

The Government also misquotes the lower Court's Finding No. 9 as to what the Commissioner found the Adams patent disclosed at p. 5 (lines 3 to 6) of its Brief, by altering the word "disclosed" to "claimed" in order to manufacture an argument that the Commissioner and Court of Claims made an error in interpreting the claims of Adams (Govt. Brief, Footnote p. 5). The Government says "The invention *claimed* was 'a battery comprised of a magnesium electropositive electrode (anode), a cuprous chloride electronegative electrode (cathode), and a water electrolyte' (R. 698)." (Govt. Brief, p. 5). But the Commissioner found at R. 698 that "The Adams patent *disclosed* a battery comprised of a magnesium electropositive electrode (anode), a cuprous chloride electronegative electrode (cathode), and a water electrolyte." [Emphasis ours in both cases]

It is submitted that this blatant alteration of the lower Court's finding is persuasive evidence that the Government's effort to show real error is bankrupt.

No issue of infringement was raised by the Government's Petition (Pet. p. 2) and none should be raised now. Adams will not answer allegations on a question as to which review has not been sought and granted unless this Court otherwise instructs, but states that the lower Court's findings on the subject of infringement (Nos. 25-38, R. 705-708) are unimpeachable, assuming the Government had the right to assail them, which it does not, even by innuendo.

E. The Course of This Litigation

In 1955 Adams first examined a Government water-activated battery (R. 85-6) and thereafter requested compensation from the Government and was rejected (R. 3).

On May 2, 1960, this suit was brought against the United States in the Court of Claims to recover for (1) breach of contract, and (2) for infringement of the Adams patent No. 2,322,210, issued June 22, 1943 (R. 1, 689-90).

At the trial, the Government urged that it was within the skill of the art to construct the Adams battery, but the Government's own expert did not agree (R. 382).

The Government also urged that the Adams patent was anticipated by much ancient art. It relied particularly on nine patents, most of which were 50 or 60 years old at the time, which disclosed zinc and silver chloride as electrode components for batteries. The Government's own expert admitted these were all "bell-ringers" or conventional intermittent use batteries, and therefore a completely different type of battery than Adams (R. 370). The Government urged that the art taught that magnesium could be substituted for zinc in a battery, but the Government's own expert testified to the contrary (R. 362-3).

The Government failed to produce any prior art reference that disclosed a battery having a magnesium anode and a cuprous chloride electrode (R. 382-3, 704).

Adams urged at the trial that silver chloride and cuprous chloride were equivalents (R. 37, 33, 629-33). The Government admits it never took that position (R. 637, lines 17-19). Adams proposed to the Trial Commissioner requested Findings of Fact that silver chloride and cuprous chloride were equivalents (R. 629-33). The Government objected to all of them (R. 637-40). The Commissioner thereupon refused to find them equivalents (R. 694-6, 705-8). Neither side excepted. The Commissioner therefore found the Government's silver chloride, magnesium batteries did not infringe (R. 707-8).

The Commissioner recommended that the Adams patent be found valid and infringed only by the Government procurement of magnesium, cuprous chloride batteries (R. 695-6, 705-8). The Commissioner recommended that the breach of contract cause be dismissed (R. 640, 661).

The Court of Claims on April 17, 1964, rendered a final judgment that the patent was valid and infringed but deter-

mined that it did not have to decide the breach of contract cause (R. 689-90; 330 F. 2d 622, 624).

Neither the Government nor Adams took issue with the final judgment of the Court of Claims on the patent claim rendered April 17, 1964, until the Government did so nine months later.

On May 11, 1964, Adams moved the Court of Claims to alter its opinion and judgment, or for a rehearing *solely* to determine the issue of the breach of contract[11] (R. 711).

On October 16, 1964, the Court of Claims rendered a final judgment that there was no breach of contract[12] and made no change in the prior decision on the patent (R. 712-13).

The Government filed an application for an extension of time to file a petition for a writ of certiorari as to the final judgment of the Court of Claims on the *patent claim* on January 14, 1965. This was nine months after the judgment on that claim.

By order dated January 21, 1965, the Chief Justice extended the time for petitioning for certiorari to and including February 13, 1965 (R. 714).

The Government's petition for certiorari requesting this Court to review the final judgment of the Court of Claims on the patent claim was delivered to the Clerk of the Supreme Court on February 12, 1965. No attempt was made to serve Adams until February 16, 1965, three days after the Government's time had expired (This Brief, p. 87). Certiorari was granted on March 29, 1965 (R. 715), 380 U.S. 949.

In its petition the Government asserted that the "Question Presented" involved the fact that silver chloride and cuprous chloride were equivalents, Adams had substituted one for the other, his invention was thereby invalid, and urged that the lower Court be reversed on that basis (Petition, p. 2 and p. 6). The Government continues to maintain that position in its Brief (pp. 7, 17, 21).

On May 10, 1965, Adams filed a motion to Dismiss the Writ on the ground that the Government was seeking to reverse the decision below by reversing its position on the question of the equivalence of cuprous chloride and silver

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[11] Which included a charge of an unlawful taking under the Fifth Amendment.

[12] The Court of Claims did not mention the issue of an unlawful taking.

chloride which it had maintained before the Commissioner. This Court entered an Order on June 1, 1965 postponing further consideration of this Motion until the hearing on the merits (381 U. S. 931).

Summary of Argument

It is the position of Adams that the standard of invention pertinent to this case is set forth in this Court's decisions in *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275 and *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84.

All batteries, prior to Adams, had certain recognized deficiencies which the art had long sought to overcome. Among these were:

(1) Conventional batteries could effectively deliver only intermittent, as opposed to continuous, power.

(2) Conventional batteries delivered power that declined over each period of use. They could not provide the level electrical power that a generator can provide, for example.

(3) Conventional batteries were adversely affected by low temperatures in that they delivered less and less power as the temperatures declined and at extremely low temperatures failed entirely.

The Adams battery solved all of these problems. It delivers continuous power, like a generator. It delivers level power, like a generator. And it will deliver such power at all temperatures from 150° above zero to –60° below zero. No other battery, even today, can do this.

Both Adams and the Government proved that the components of the Adams battery were old, as failures, in the art more than 50 years prior to the Adams invention. The art had long wished to employ the components successfully employed by Adams. Magnesium, used by Adams as his anode, had often been recommended for use in batteries. However, the proofs at the trial showed that no one prior to Adams knew how to use magnesium in a battery because of its extreme corrodibility or reactivity. The Government put in a number of patents and treatises on this subject which, taken chronologically, showed that each earlier one

had failed to solve the problem. The last one, issued just two years prior to Adams' work, so indicated and was itself a failure as the testimony at the trial showed. The record is clear that the employment of magnesium defeated the ingenuity of the battery art prior to Adams. The cuprous chloride material used by Adams for his cathode was also early recommended in the art in conjunction with other substances but never employed successfully as far as the record shows.

The Adams battery consists simply of an anode of magnesium and a cathode of cuprous chloride (with or without carbon) and the battery is activated by water. Conventional Voltaic theory taught that this combination could not work because both substances are insoluble in water, and water is a non-conductor of electricity. Thus, no chemical reaction and no electrochemical reaction can occur in the Adams battery. But these reactions do occur, although no one knows how or why.

The Adams battery, after being activated, operates in a completely unbattery-like fashion. First, it will not deliver power on demand, but only after an appreciable period of time. Second, once started, it cannot be turned off short of destroying it. Third, in operation and when attached to a load, it heats and often boils.

All of these characteristics were considered to be destructive and when Adams disclosed his battery to conventional battery experts, including the Government's experts at Fort Monmouth, they stated that the battery was inoperative.

However, ten years after the event, these same experts have taken out patents on the same battery system as Adams, in which the virtues, novelty and utility of the battery are extolled. These patents are now owned by the Government.

The Government takes the position that the Adams battery is not new, however, this position is contrary to the position the Government took in its Petition. Moreover, the Government could find no reference that showed the successful use of magnesium in a battery, nor could it find a reference that showed the successful use of cuprous chloride (either alone or with carbon) in a battery. Of course, no reference showed the combination.

The Government urged art consisting of zinc-silver chloride batteries. The Government maintains that zinc and

magnesium are equivalents in batteries, but the record is dispositive that they are not. The Government maintains that silver chloride and cuprous chloride are equivalents. However, before the lower court, only Adams took the position that they were. The Government opposed all of Adams proposed Findings to the Commissioner that they were equivalents. The Commissioner decided that issue in the Government's favor and thereupon held that the Government's silver chloride-magnesium batteries did not infringe. It is submitted that the Government cannot reverse itself on a question of fact in order to attack a decision that the Government itself induced the Commissioner to make.

The Government admits the Adams battery is useful but takes the position that it was obvious to make the invention. However, the proofs are clear that the Adams battery was completely unobvious. Not only was its advent on the scene greeted with surprise and disbelief by the Government's own experts, but all of the elements needed for its construction were available in the art for fifty years before Adams put them together as a result of his intensive experiments. Furthermore, the Government cannot explain the fact that there is no theory that will explain the operation of the Adams battery even today, twenty years after the event, and no theory that would have predicted its operation or indicated its construction in 1940 when Adams made his invention.

It is considered that the aforesaid facts, found by the lower court, meet the criteria of this Court's cases as set forth in the opening paragraph of this summary. First, the Adams invention is a contribution, and an important one, to useful knowledge and the science of electrochemistry. The uses of the Adams battery are manifold. It supplies power in a manner which no prior art battery was able to do and thereby fills a long-standing need in the battery art. In addition, it has come to fill a host of exotic new uses. It is unsurpassed for high altitude use and it is unsurpassed for underwater use. The elements of the Adams battery take on a new function from being brought into concert and produce a battery whose operating characteristics are opposite, in most respects, to all prior art batteries. The Adams invention has advanced science and it has been recognized by masters in the field of electrochemistry as a major advance. Thus the criteria set forth in both the majority and concurring opinions of *A & P* are

fulfilled. The historical test as set forth in *Goodyear* v. *Ray-O-Vac,* 35 U. S. Code 103, and *Hotchkiss* v. *Greenwood* is also met in that all of elements necessary to construct the Adams battery were old in the art fifty years before Adams put them together. Conventional theory taught that they could not work. When they were put together the surprise and astonishment of the experts which greeted the result supplies objective proof of the unobviousness of the invention. So, too, does the fact that there is no scientific theory that will explain the operation of the battery.

For all of the above reasons, it is submitted that the Adams invention also meets the test of *Cuno,* for it clearly shows the flash of creative genius, not merely the skill of the calling.

ARGUMENT

I. The Standard of Invention and The Adams Contribution

A. The Government's Position

In its Brief, the Government urges that the "straight forward application of the three statutory tests is dispositive of the present litigation" (p. 12) referring to 35 U. S. C. § 101 requiring that an invention must be (1) new and (2) useful and 35 U. S. C. § 103 requiring that an invention must be (3) unobvious.

Referring to the allegation that Adams is not new, that is factually answered in this Brief, pp. 57-76. Moreover, it was admitted by both sides that all of the elements of the Adams combination were individually old but the combination was specifically new, and the lower Court so found (R. 704, 692). The Government's position that "the Adams battery is not 'new' " (Brief, p. 12) is in direct contradiction to the admission in its Petition that "It is true that Adams put together elements not actually combined before and obtained more favorable results, for some purposes, than had prior combinations." (Pet., p. 11).

To show that Adams is not "new," the Government relies primarily on a single patent reference identified as the Skrivanoff 1888 patent (DX-19, R. 591, 381) which *the testimony showed was a battery that exploded violently upon assembly* (R. 388). The Government has cited in its

Brief (p. 34) *Pacific Contact Laboratories, Inc.* v. *Solex Laboratories,* 209 F. 2d 529, 532 (9 Cir. 1953), *cert. denied* 348 U. S. 816 which it is submitted disposes of the Skrivanoff reference in these words:

> "And a prior unsuccessful experiment does not constitute invention and cannot therefore be an anticipation."

See also *Coffin* v. *Ogden,* 18 Wall 120, 124; *Smith* v. *Snow,* 294 U. S. 1, 17.

The basic difficulty with the Government's position that the Adams battery is not *new,* is that there has never been a battery before that had its operating characteristics. (This Brief, pp. 4-7). If the Adams constitutents had been previously assembled in a battery, that battery would have had the characteristics of the Adams battery. As the Government originally admitted, Adams is new.

The Government still admits that the Adams invention is useful (Govt. Brief, p. 12). But it wishes this Court to review the finding of the lower Court that the Adams invention was unobvious. The Government's Brief says:

> "We submit that, lacking a meaningful comprehensive test of patentability, it is important for the Court to establish that these statutory tests are to be rigorously and independently applied where validity is in question." (Brief, p. 12)

and

> "The important consideration, we believe, is that each patent application be scrutinized with care and that the standard, as written, be rigorously applied." (Brief, p. 13)

In other words, this Court is asked to insure that the Court of Claims has done a careful and rigorous job.

It is respectfully submitted that this is not the question that this Court was requested to review in the Government's Petition for Certiorari. The entire thrust of the Government's Petition for Certiorari was that there was a constitutional test which existed independently of the three statutory tests and although the statutory tests might have been met, still a patent might not be valid for failure to meet the constitutional test as enunciated by the case law of this Court. It was suggested that the constitutional

test related to such decisions as those of this Court in *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84 and *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147. This position apparently has been withdrawn by the Government by its attack in its brief on the decision in *Cuno* (Govt. Brief, pp. 13, 14, 20). As to *A & P*, that decision is scarcely quoted in the Government's brief. This may be due to the fact that the Government's brief cites a total of 36 cases of which 30 involve mechanical combinations, and it is submitted that 29 of those 30 cases are distinguished by the decision of this Court in *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 152, itself a mechanical combination case, wherein it is stated:

> "Elements may, of course, especially in chemistry or electronics, take on some new quality or function from being brought into concert, but this is not a usual result of uniting elements old in mechanics."

Since *A & P* appears to remain highly relevant to the questions presented in the Adams case we will discuss it.

B. Adams Position

(1) *The Necessity for "Invention"*

In *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 150-51, the Court posed the question of the standard of invention in a case involving a combination comprised of elements designated to be old, as follows:

> "What indicia of invention should the courts seek in a case where nothing tangible is new, and invention, if it exists at all, is only in bringing old elements together?"
>
> "While this Court has sustained combination patents,[4] it never has ventured to give a precise and comprehensive definition of the test to be applied in such cases. The voluminous literature which the subject has excited discloses no such test.[5] It is agreed that the key to patentability of a mechanical device that brings old factors into cooperation *is presence or lack of invention.*" (340 U. S. 147, 150-1) [Emphasis ours and footnotes omitted]

The Court has been consistent in requiring the presence of invention to sustain patents and under the umbrella of

that concept a number of indicia to determine such presence have been formulated.

In *A & P*, the Court stated some of the indicia as follows:

> "The negative rule accrued from many litigations was condensed about as precisely as the subject permits in *Lincoln Engineering Co.* v. *Stewart-Warner Corp.*, 303 U. S. 545, 549: 'The mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce *no new or different function or operation* than that theretofore performed or produced by them, is not patentable invention.' To the same end is *Toledo Pressed Steel Co.* v. *Standard Parts, Inc.*, 307 U. S. 350, and *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84. *The conjunction or concert of known elements must contribute something; only when the whole in some way exceeds the sum of its parts* is the accumulation of old devices patentable. Elements may, of course, especially in chemistry or electronics, take on some new quality or function from being brought into concert, but this is not a usual result of uniting elements old in mechanics." (340 U. S. 147, 151-2) [Emphasis ours]

The Court added: *"The function of a patent is to add to the sum of useful knowledge."* (340 U. S. 147, 152) [Emphasis ours]

In the above case, Mr. Justice Douglas wrote a concurring opinion with which Mr. Justice Black agreed, and stated certain objective criteria as follows:

> "The invention to justify a patent, had to serve the ends of science—*to push back the frontiers of chemistry*, physics, and the like; *to make a distinctive contribution to scientific knowledge.*" (340 U. S. 147, 154) [Emphasis ours]

Mr. Justice Douglas then added that this was the reason why the opinions of this Court have commonly taken "inventive genius" as the test and cited in a footnote a number of cases in support. The footnote read:

> "'Inventive genius'—Mr. Justice Hunt in *Reckendorfer* v. *Faber*, 92 U. S. 347, 357; 'Genius or invention'—Mr. Chief Justice Fuller in *Smith* v. *Whitman Saddle Co.*, 148 U. S. 674, 681; "Intuitive

> genius"—Mr. Justice Brown in *Potts* v. *Creager*, 155 U. S. 597, 607; "Inventive genius"—Mr. Justice Stone in *Concrete Appliances Co.* v. *Gomery*, 269 U. S. 177, 185; "Inventive genius"—Mr. Justice Roberts in *Mantle Lamp Co.* v. *Aluminum Products Co.*, 301 U. S. 544, 546; *Cuno Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 91, "the flash of creative genius, not merely the skill of the calling." "

Then, Mr. Justice Douglas stated at 340 U. S. 147, 155 that:

> "Patents serve a higher end—*the advancement of science*" and invention—
> *"has to be of such quality and distinction that masters of the scientific field in which it falls will recognize it as an advance."* [Emphasis ours]

It is submitted that the majority opinion and the concurring opinion do, indeed, closely concur in requiring that a patent make an addition to the sum of useful knowledge (majority) or a distinctive contribution to scientific knowledge (concurring).

In its petition the Government forcefully pointed out the fact that this Court had many times required the presence of "inventive genius" or the like as a criterion for invention and cited many of the cases referred to by Mr. Justice Douglas in the aforesaid footnote (Pet. p. 12). It urged, as a reason for granting certiorari, that lower courts were failing to apply that criterion (Pet. p. 12).

The Government in its Brief, no longer finds the presence of creative genius necessary (Govt. Brief, pp. 13, 20) it appears so blinded by the "flash" that "creative genius" is also lost. The Government, although citing *A & P*, never mentions the necessity for a contribution to useful or scientific knowledge. It never directly refers in its argument to the constitutional standard of invention, as it did so often in its Petition (Pet. pp. 12, 13).

It is submitted the reason for this change of viewpoint is that when one applies the facts of record in Adams to the decision of this Court in *A & P*,[13] as expressed in both the majority and the concurring opinions, it becomes clear that

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[13] Or to *Cuno*; for the evidence of the presence of a "flash of creative genius, not merely the skill of the calling" in the Adams invention is compelling, as will be seen.

the Adams invention possesses just precisely those qualifications of a major contribution or scientific advance, including the qualification of recognition by masters of the scientific field in which it falls, as this Court has long required.

(2) *The Historical Approach and Obviousness*

In addition to the tests of invention set forth in *A & P* and *Cuno* this Court has also often applied a test which has been characterized as the "historical approach." This test is set forth in a long line of cases, stretching from *Loom Co.* v. *Higgins*, 105 U. S. 580, 591 to *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 279 and includes *Keystone Mfg. Co.* v. *Adams*, 151 U. S. 139, 144-5 and *Potts* v. *Creager*, 155 U. S. 597, 608.

The historical test implies an examination of the history of the prior art, as seen by those skilled in it, to determine what the art knew and understood at the time the inventor appeared on the scene. Tied in with that test are the decisions of this Court since *Hotchkiss* v. *Greenwood*, 11 Howard 248, 52 U. S. 248, establishing that if no more ingenuity and skill is necessary to construct the device than was possessed by an ordinary mechanic acquainted with the art, the patent was void.

This test has now become a part of the statutory law of patents (35 U. S. C. § 103) which reads:

> "§ 103. Conditions for patentability; non-obvious subject matter
>
> "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

Although the Government takes the position that the Adams invention was obvious and fails to meet the test of 35 U. S. C. § 103, it does not cite or discuss *Goodyear* v. *Ray-O-Vac* in its Brief although the lower Court decision it seeks to reverse, relied on it in part (R. 692). In dis-

cussing *Hotchkiss* v. *Greenwood* and the impact of 35 U. S. C. § 103, the Government in its Brief deprecates this Court's decision in *Cuno* (Govt. Brief, pp. 13, 20)[14] although it has always been at least dubious that the term "flash of creative genius" meant or was intended to mean a state of mind. As the Government had indicated originally in its Petition (Pet. p. 12) the term was synonymous with "inventive genius" as used in a long line of this Court's decisions, and they all meant that the invention had to show that factor by its qualities, not that the inventor had to be one, as the Government now suggests (Govt. Brief, pp. 20, 13-14).

The Government's position on *Cuno* is particularly confusing in view of its position on *Sinclair & Carroll Co.* v. *Interchemical Corp.*, 325 U. S. 327.

The Government says *Cuno* is overruled because it required a "flash of genius" (Govt. Brief, pp. 20, 13-14) and quotes the Reviser's Note to Section 103 so to show (Govt. Brief, p. 34). However, the Government says this is not material to its case because it now relies on *Sinclair*, which "did not apply the 'flash of genius' terminology or standard" (Govt. Brief, p. 20). But in discussing *Sinclair* in relation to the Adams invention, the Government says "there, as here, the patent in suit was not the product of *long and difficult experimentation*" (Govt. Brief, p. 22) [Emphasis ours].

The Reviser's Note, quoted by the Government at its Brief p. 34, shows that "the second sentence [of Section 103] states that patentability as to this requirement is not to be negatived by the manner in which the invention was made, that is, it is immaterial whether it *resulted from long toil and experimentation* or from a flash of genius." [Emphasis ours]

It would appear that *Sinclair* is thereby specifically overruled on the exact point relied on by the Government and for the same reason that *Cuno* is overruled, at least according to the Government's reasoning.

The Government has reversed its position on the law in the short space of seven months between its Petition and its Brief. The law and rationale thereof which it cited to this Court as a reason for granting certiorari, the Govern-

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[14] In the Appendix to its Brief, the Government vacillates on its position on *Cuno*. See pp. 35-6 thereof.

ment no longer urges. The law it now cites to this Court is of dubious validity.

It is Adams' position that the *A & P, Cuno* and *Ray-O-Vac* cases delineate the standard of invention as treated by this Court in its late decisions on the subject, and 35 U. S. C. §103 does not change that standard.

It is submitted that there is a very good reason why the Government vacillates on the law and it is the same reason the Government cites the testimony in this case to this Court but *once*. That reason is simply that the effect of the testimony and trial record in the Adams case, when applied to the test of this Court's criteria of invention as enunciated in *A & P, Cuno* and *Ray-O-Vac,* is to demonstrate invention of the highest order under any and all of those criteria. It is further submitted that this Court will have little difficulty in determining that Adams is an inventor if it will apply the law the Government set forth in its Petition and criticizes in its Brief to the trial record in this case. Should this Court apply the different and lesser standard set forth in the Government's Brief, the result will be the same *a fortiori.*

To briefly show this, let us relate the record broadly to the aforestated criteria of this Court in the matter of invention. Taking these criteria in the reverse order to which they are discussed above:

First, tested by the historical standard, the record shows that all of the elements employed by Adams were individually old in the art (as failures) more than 50 years before Adams made his invention (Find. 22, R. 704, 692; this Brief, pp. 7-10). During the interim, when inventive greats such as Edison, Le Clanche, Davy, De La Rue and hundreds of others had labored in the same area, no one put the Adams invention together, or suggested that it could be. When it was invented by Adams, and disclosed to eminent battery scientists, the art failed to recognize in its operating characteristics, which were different from those of any prior art battery, that the combination was the first new type of electrochemical system since Volta and that it produced unique results. The record shows that when the Adams battery was displayed and explained to the Government's own experts they judged it to be an inoperative battery because of its wholly different operating characteristics. Some of these same experts now agree

that the very characteristics which led them to believe that the Adams battery was inoperative actually provide it with its most useful and wholly new functions. Indeed these same experts have found the battery to be so valuable that they now claim it as their own and have received patents for it which are now owned by the Government. Thus, the very invention criticized by the Government in the present case as being old and obvious and falling below the standard of invention is claimed by the Government itself by at least two presently viable U. S. patents (This Brief, pp. 10-13, 7-10). As was well said in *Potts* v. *Creager*, 155 U. S. 597, 609 cited in the Government's Brief at page 33:

> "The result appears to have been a new and valuable one—so much so that, within a short time thereafter, defendants themselves obtained a patent upon a machine of their own to accomplish it."

The record further shows that today no one knows how or why the Adams battery operates. There is no scientific theory to explain its operation, and there was none to predict its operation in 1939 (This Brief, pp. 9-10, 80). Not only is the historical test thereby passed by the Adams battery, but obviousness is objectively negated.

Turning now to the other aspect of the standard of invention, the matter of a scientific contribution of magnitude, the record shows that after the initial incredulity of the experts was overcome, the Adams battery was later hailed by scientists as an important achievement which has made technical advances possible which would otherwise not have occurred and that it is unsurpassed as a tool in scientific investigation of such matters as meteorological and underwater phenomena and has a host of other important uses.

Further, the Adams battery has been hailed as an achievement in publications of the Government and its suppliers. The record shows that masters of the scientific field of electrochemistry now recognize the Adams battery to be an advance in that science. Selected statements follow:

> "Magnesium—cuprous chloride batteries have attained considerable importance, particularly as 'meteorological' or 'one-shot' batteries, . . ."
> *Fischbach*, 1950 (TX-2, R. 390, 9-10)

"The exact nature of the complex chemical current-producing reactions of this type of cell [magnesium-cuprous chloride-water] is not known in any substantial detail and much of the development has necessarily depended upon the employment of purely empirical methods."

Chubb, 1952 (PX-40, R. 491-2, 264; R. 262-4)

"DESCRIPTION—The magnesium-cuprous chloride battery is a new type of water activated battery designed to operate under certain types of extreme conditions in which normal dry batteries will not function efficiently."

Ray-O-Vac, 1955 (PX-19, R. 459, 88)

"The water activated battery systems are among the relatively new power sources which have become extremely important to the Military during the past decade."

Morse, 1956 (CX-2a, R. 439, 8)

"The definite trend to water activated batteries for high altitude and sea water applications indicates they are unsurpassed as one-shot power packs for low temperature use and for underwater operation."

Morse (*Ibid.* R. 439)

"The development of widespread use of water activated battery systems, and especially the cuprous chloride/magnesium system has helped immensely in rounding out the sources of battery furnished power."

Morse, (*Ibid.* R. 440)

"There can be no doubt that the addition of water activated batteries to the family of power sources has brought about developments which would otherwise have been technically or economically impractical."

Morse (*Ibid.* R. 440)

"The new devices designed to aid the scientists who work in the field of meteorology often times use water activated batteries to fill their power requirements. The BA 259 unit, of which nearly a million have been built, is the standard example of the successful application of a cuprous chloride battery."

Broglio, 1958 (CX-2c, R. 445-6, 8)

These statements amply support the lower Court's Finding that the "new and unexpected" results of the Adams invention constituted an "important advance in the art", "recognized throughout the industry as an extremely important step", "rounding out the sources of battery-furnished power, and filling important, long-standing needs." (R. 704, 692).

Thus the lower Court's findings are carefully consistent with the criteria of invention set forth in both the majority and concurring opinions of this Court in *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147.

By its operation the Adams battery challenges the basic electrochemical theory of the great Volta which heretofore had stood since 1800. The Adams battery provides the first operative electrochemical data which cannot be explained by conventional scientific theory (R. 262-4, 695, 206-9, 217; PX-40, R. 491-2, 264; PX-41, R. 495-6, 264). Thereby the Adams invention evidences *creative genius. Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84.

For these reasons it is submitted that the Adams invention meets every test this Court has enunciated. It is a work of inventive and creative genius. It is recognized by masters in the field of electrochemistry to be an advance and to represent a distinctive contribution to scientific knowledge. It has greatly added to the sum of useful knowledge and it meets every element of the historical test, and thereby the non-obviousness of the Adams contribution is objectively demonstrated.

The facts of record that show that Adams is an inventor were found by the lower Court and these findings correctly applied to the standard of invention as set forth in this Court's decisions. For that reason the decision of the lower Court herein should be affirmed.

II. Substantive Issues

A. Introduction

In this cause, the Commissioner, after a five-day trial decided the patent infringement cause in Adams' favor, with one exception.[15] During the trial, at which the Commissioner had the opportunity to hear and see the witnesses, to observe their conduct and demeanor on the stand, evaluate their frankness, credibility and impartiality, or the lack of it, Adams produced as witnesses, in addition to the renowned electrochemist Dr. Mantell, Mr. and Mrs. Adams, both of whom testified as to the facts of the making of the invention and the disclosure thereof to employees of the Government during World War II and the subsequent appropriation of the Adams invention by these same Government employees.

In response thereto, and despite the implications of the Adams testimony concerning the Government's employees, the Government produced not one fact witness. The Government's first expert was Howard Knapp, whose direct testimony is no longer relied on (R. 302-4).

The Government's second expert was Dr. Joseph C. White, a long time employee of the Government at the Naval Research Laboratory (R. 344) and a witness whose testimony was favorable to Adams at every crucial point (R. 362-3, 382-3, 384).

This brief will delineate the facts of Record upon which the Court below found the Adams patent valid in accordance with the decisions of this Court defining the standard of invention.

The Adams patent is an electrochemical patent defining a battery system capable of producing electric current (R. 120). It is not concerned with structure nor with the specific physical shape, size or arrangement of the battery components, nor with methods of making them.

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[15] The Commissioner refused to find that silver chloride was the equivalent of cuprous chloride and to that extent limited the patent and its claims to the precise language thereof, permitting the patent no broader scope despite the pioneering nature of the invention. This ruling was not excepted to by either Adams or the Government, although the Government now urges the Commissioner should be reversed for not finding the opposite. (This Brief, p. 88).

The invention resides in the electrochemical system involved and the effects produced thereby. The battery comprises a cathode made of cuprous chloride to which a small amount of carbon may be added, the anode is magnesium. This exact combination of chemical elements was never assembled before (R. 704, 692, 382-3, 264; Govt. Pet., p. 11). The battery is activated by water, a substance which will not conduct electricity (R. 264). Although the theory of selection contradicted known principles of electrochemistry and the act of selection was both fortuitous and novel, it is the unique results of the battery thereby provided which represents a major contribution to the progress of science and the useful arts.

Adams and the Government combined to prove that the physical structure, shape and size of the components, and methods of making same, of the battery shown in the Adams embodiment and of the batteries procured by the Government were old long before Adams (R. 125, 134, 136-7, 138-9, 127-9). Adams and the Government combined to prove that all of the elements used by Adams in his battery were individually old in the art by 1888 at the latest. These elements were rejected failures at that time and remained so until Adams.

In the intervening fifty years between 1888 and the work of Adams in 1939, the many great scientists who experimented in the field of batteries had failed to put the Adams combination together, although all of the necessary materials and techniques were available throughout that period, and the need for batteries that would function at low temperatures and were capable of providing a continuous source of level power was great (R. 704, 692).

After a half century of failure by the art, it fell to Adams to put the novel system together, and to recognize in the resulting battery's unusual and seemingly inoperative characteristics the qualities of a great new scientific advance in the battery art.

One had to fly in the face of conventional battery theory to put this new electrochemical system together. Conventional battery theorists thought in terms of highly conductive electrolytes, intermittent use batteries, declining power delivery over each period of use and minimal "local action" when the battery was disconnected. Adams, unhampered by stereotyped scientific theory, was naive enough to attempt combinations of elements that contradicted the con-

ventional Voltaic battery theory. But having done so, and having obtained what may be more accurately described as a heat engine than a battery, Adams was genius enough to recognize that he had produced an operative battery despite its unbattery-like characteristics. He alone was able to comprehend what he had accomplished and the utility of his discovery. He was also patriot enough to reveal his battery system fully and fairly to the Government within the month after Pearl Harbor and to receive for his pains first, adverse criticism and bitter discouragement by the Government's battery experts and second, the appropriation of his invention by these same Government battery experts years later in patents the Government now claims as its own (R. 450; TX-2, R. 390, 9-10; TX-6, R. 392, 10).

The Court below has held the Adams patent valid and infringed (Find. Nos. 24 and 38, R. 704, 707-8). The Court below noted that the Government was unable to find a reference of any kind disclosing or suggesting the specific combination of elements used in the Adams battery (Find. Nos. 22 and 23, R. 704), and that none of the Government's references even suggested that a battery having the capabilities of the Adams battery could be produced by any means (Find. No. 22, R. 704). Finding that each of the elements of the several claims of the Adams patent was individually old in the battery making art at the time of the filing of the patent in suit (Find. No. 24, R. 704), the Court found:

> ". . . the Adams invention was not, as a whole, obvious, at the time the invention was made, to a person having ordinary skill in the battery art." (R. 704)

Thus, the Court properly found the patent valid and the record supports it at every point. The findings of fact show that the standards of invention enunciated by this Court in *Cuno*,[16] *Ray-O-Vac*[17] and *A & P*[18] (both majority and concurring opinions) are far exceeded by the proofs of record relating to this invention.

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[16] *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 91.

[17] *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 279.

[18] *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 152, 154, 155.

That record shows the following:

(1) Adams flew in the face of the art and the teachings of conventional battery theory in

(a) combining the ingredients that he did to make his battery, and

(b) recognizing that the new result, which appeared to be a completely inoperative battery, was in fact a battery of a type that had never been seen before (This Brief, pp. 4-10).

(2) Articles published by the Government and the Government's suppliers establish that the Adams battery system is recognized by battery experts as a major scientific advance. Adams created the first battery that provided a continuous source of level power at low temperatures, the first truly new type of battery since Volta's original invention of the first battery in 1800 (This Brief, p. 36).

(3) In creating his battery system, Adams fulfilled age old dreams in the battery art and contradicted existing battery theory in

(a) solving the problem of employing magnesium, which had always been recognized on a theoretical basis as having beneficial electromotive characteristics, but which, due to its high corrodibility and chemical reactivity had defied use in a practical battery (This Brief, p. 42) and

(b) solving the problem of effectively employing the dangerous and discarded cuprous chloride (This Brief, p. 43) and making therefrom a practical operative battery that was capable of being activated by water (This Brief, p. 45).

(4) Due to its unusual operating characteristics, the Adams battery has filled long felt wants. It provides an effective source of power for all battery motivated mechanisms that require level or constant current delivery, such as radio receivers or transmitters, emergency sources of power and light, warning and signal lights, rescue apparatus and devices intended for low temperature or arctic use and operation at sea. These are all old devices and the

need for properly powering them has existed as long as they have (This Brief, p. 53).

(5) In addition to fulfilling long felt wants, the Adams battery system, when discovered, produced unexpected and important results entirely different from those which are obtained by any other battery, and which no one believed could be achieved by any means:

(a) The Adams battery when activated can be made to heat and boil. It was recognized by Adams, and initially by Adams alone, that the battery can thus be used for extremely low temperature operation (This Brief, pp. 48, 4).

(b) The battery produces level voltage and amperage. Curves of operation of a single cell of the Adams battery system show unique and almost mathematically perfect level curves. There is no other battery that has these characteristics. There is no battery theory that will explain these characteristics (This Brief, pp. 50, 4).

(c) The Adams battery has the unexpected characteristic of maintaining an almost constant efficiency regardless of the electrical load imposed upon it. Within limits and with small percentage differences in efficiencies, these batteries are as efficient under sixteen times normal load as they are under normal load (This Brief, p. 55).

(d) In addition, the battery's efficiency is unaffected by operation under a combination of the conditions of high load and extremely low temperature operation, a feature found in no other battery. (This Brief, p. 56)

(e) The battery is light in weight, cheap and highly efficient for its size and weight. It has the advantage of being operable with any type of water, thus making it utilizable for rescue devices, safety devices and a wide range of military and naval uses. (This Brief, p. 57)

(6) The prior art cited by both sides shows that before Adams, the battery art did not know how to successfully employ any of the components used by Adams. The prior art validates the Adams patent. (This Brief, p. 57)

(7) The surprise and disbelief displayed by the Government's own experts and attested to by Adams' expert, when the characteristics and properties of the Adams battery system were first announced and shown to them, is proof beyond peradventure of its unobviousness. If the experts were astonished and refused to believe the evidence of their own eyes with the battery operating before them, how can the invention have been obvious? Particularly since they later agreed they were wrong and now claim the discovery as their own (R. 450, This Brief, p. 76).

(8) As the record establishes, there is no scientific theory today that will explain the operation of the Adams battery and none that would predict its operativeness in 1940; this being so, how can the invention have been obvious? (This Brief, p. 80.)

B. The Adams Invention Is Recognized as a Scientific Advance by the Government, Its Suppliers and Battery Experts

Adams worked in an art littered with the proliferation of a century of experiment by myriad scientists; nevertheless he managed to produce, out of that confusion, a radically new and astonishing invention using only what had long ago been discarded. Thereby Adams executed an invention of such beautiful simplicity that it can only be regarded as a stroke of genius.

The Adams invention performs a function never before performed, and one of such novelty as to mark an extremely important step in the progress of the art.

The Court below so found. It said:

> "The Adams invention was the *first* practical, water-activated, constant potential battery capable of operation at low temperatures. When Adams first disclosed his invention to others skilled in the art, he did not know its theory of operation and it was received with considerable skepticism. However, this development was subsequently recognized throughout the industry as an *extremely important step in rounding out the sources of battery-furnished power, and filling important, long-standing needs* of both civilian and military natures." (Find. No. 23, R. 704) [Emphasis ours]

This finding is amply supported by the Record for Adams created the first practical battery that provided a continuous source of level power (R. 704, This Brief, pp. 4-5, 50). It was the first such battery ideally suited for low temperatures and high drain uses (This Brief, pp. 48, 56). Its pioneering nature is shown by the skepticism and disbelief of the Government experts to whom Adams disclosed it (Find. No. 23, R. 704; see also pp. 76 to 80 of this Brief), and by the fact that, now as then, the electrochemical theory upon which the Adams battery operates is unknown (R. 695; see also pp. 80 to 82 of this Brief).

As will be shown from the published statements of the Government, its suppliers, and battery experts, the Adams patent meets the criteria of invention set forth in *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, for it:

(1) performs a new and different function than any prior art battery (as required at 340 U. S. 147, 151)

(2) has added to the sum of useful knowledge (as required at 340 U. S. 147, 152)

(3) has pushed back the frontiers of electrochemistry and constitutes a distinctive contribution to scientific knowledge (as required at 340 U. S. 147, 154)

(4) has been recognized by masters of the scientific field of electrochemistry as a distinctive advance (as required at 340 U. S. 147, 155)

Dr. Mantell testified that the Adams battery was the first to deliver a continuous source of power at constant voltage and amperage (R. 114-5, 118 and 216-7).

He stated at R. 217 that:

> "It is interesting to note that all of our battery philosophy up to this time indicated that the battery should be designed not to rise in temperature, but be designed primarily for intermittent service. That is what a battery was good for, and that when you used it in continuous service, the battery would polarize and lose voltage, and it was considered that a battery system consisted of electrodes, with electrolyte, and the electrolyte should be a conductor."
>
> "He [Adams] comes along and says: 'I don't do that,' and naturally he is received with skepticism, particularly, by a man who was one of the outstand-

ing battery experts[19] in the world, and who has probably tested and examined more battery systems than anybody else." (R. 217)

The impact on the art and on the Government of the Adams battery system is best demonstrated in the published statements of the Government, its experts and employees and its suppliers.

Dr. Fischbach, of the U. S. Army Signal Corps Laboratory at Ft. Monmouth, N. J., one of the men to whom Adams disclosed and demonstrated his batteries in 1942 and 1943, and who tested it and publicly announced he did not at first believe it could operate, said in his patent applied for in 1950 and issued in 1953, that:

> "This invention relates to primary cells, of the deferred action type, using the electrochemical system magnesium-water-cuprous chloride.
>
> "Magnesium-cuprous chloride batteries have attained considerable importance, particularly as 'meteorological' or 'one-shot' batteries, due to their high capacity per unit of weight and volume, their excellent operating characteristics even at low temperatures (linear potential and capacity), their ease of activation with water as electrolyte and their low cost of manufacture." (TX-2, R. 390, 9-10)

The Fischbach patent[20] is owned by the Government (R. 390). Only the Government now owns a patent on the Adams battery for Adams' patent expired in 1960 (R. 393).

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[19] The outstanding battery expert referred to by Dr. Mantell was the late Dr. Vinal of the National Bureau of Standards.

[20] Its claims cover the same electrochemical system as Adams. For example, claim *10* of Fischbach reads:

> "10. A deferred action type primary battery using the system magnesium-cuprous chloride comprising juxtaposed electrically connected cells, said cells each comprising as internal elements a magnesium electrode, a spacer of bibulous ionically conductive material, and a cuprous chloride electrode, said cuprous electrode comprising a thin grid supporting a porous spongy mass of cuprous chloride." (Not reprinted. See original Trial Exhibit 2).

This is the same battery as Adams and is claimed in the same manner as Adams claimed his battery, which the Government now says is not an invention. See Adams Claim 1 (R. 395).

Dr. Chubb, of the Eagle-Picher Company, a supplier of the Government, used the same terminology as Fischbach concerning the magnesium-cuprous chloride battery. Chubb's patent issued in 1954 (TX-6, R. 392, 10), and *is also now owned by the Government.* It is submitted that the tribute paid to the Adams battery system, first by the praise contained in these two patents, and second by the facts concerning their origin and ownership, is beyond cavil.

In 1950, the same Dr. Fischbach wrote an article published in the August, 1950 edition of *Electrical Engineering,* in which he stated:

> "Standard-type primary and secondary batteries are unsatisfactory for certain types of Army and Air Corps equipment and, consequently, special purpose batteries suitable for these particular applications had to be developed. This article describes three systems which have been found to be the most effective at the present time.
>
> * * *
>
> "Of the three afore-mentioned systems, the magnesium, water, cuprous-chloride system seems to offer the best solution for some of the specialized applications, ..."
> (R. 448, 449)

E. M. Morse of the Eagle-Picher Company, another supplier of the Government, stated in 1956 in the Proceedings of the Tenth Annual Battery Research and Development Conference held at the Signal Corps Engineering Laboratories at Ft. Monmouth, New Jersey, sponsored by the U. S. Army and published by the Government:

> "The water activated battery systems are among the relatively new power sources which have become extremely important to the Military during the past decade . . . The definite trend to water activated batteries for high altitude and sea water applications indicates they are unsurpassed as one-shot power packs for low temperature use and for underwater operation.
>
> "The development of widespread use of water activated battery systems, and especially the cuprous chloride/magnesium system has helped immensely in rounding out the sources of battery furnished

power . . . There can be no doubt that the addition of water activated batteries to the family of power sources has brought about developments which would otherwise have been technically or economically impractical. It appears that present developments will tend to increase the ever-broadening field for the use of water activated batteries." (CX-2a, R. 439, 440, 8)

E. Broglio, also of the Eagle-Picher Company, stated in 1958 in the Proceedings of the Twelfth Annual Battery Research and Development Conference at Ft. Monmouth published by the Government, that:

> "The new devices designed to aid the scientists who work in the field of meteorology often times use water activated batteries to fill their power requirements. The BA 259 unit, of which nearly a million have been built, is the standard example of the successful application of a cuprous chloride battery. (Figure 1) This battery has been supplying much of the power to gather weather information from radiosonde balloons. * * * The most significant point about these batteries is that they operate under environmental conditions which would normally freeze the electrolyte and cause them to be inoperative." (CX-2c, R. 445-6, 8).

In an Engineering Bulletin published about 1955 by the Ray-O-Vac Co., a Government supplier, entitled "Characteristics of the Magnesium Cuprous Chloride Battery" it is stated:

> "DESCRIPTION—The magnesium-cuprous chloride battery is a new type of water activated battery designed to operate under certain types of extreme conditions in which normal dry batteries will not function efficiently . . ."
>
> "TEMPERATURE RANGE—Satisfactory operation at temperatures ranging from +140°F to -60°F or at altitudes of 100,000 ft. is an important characteristic . . ."
>
> "LIGHT WEIGHT—The light weight of magnesium-cuprous chloride units compared to conventional dry batteries of comparable capacity make them extremely desirable for applications where weight is an important factor . . ." (PX-19, R. 459, 88)

The Burgess Battery Co., a supplier of the Government discussed its A. M. Power Units (water activated batteries including cuprous chloride-magnesium batteries) in a publication as follows:

> "Burgess A. M. Power Units Offer a New Type of Highly Portable Power Supply"
>
> "Constant Voltage—Constancy of voltage is an important factor in electronic equipment. In this respect A. M. Power Units have a definite advantage because they deliver practically constant voltage throughout their service . . ."
> "Moreover the voltage is not greatly affected by the current drain. Increasing the current 16-fold only lowers the *peak voltage* from 1.60 to 1.52 per cell."
>
> • • •
>
> "High Current and Power Output—A. M. Power Units deliver power equal to that of batteries many times larger . . . For obtaining high power from a small source, A. M. Power Units are unexcelled."
> "Constant Output—Whatever the load, the energy output of A. M. Power Units is practically constant . . ."
> "Light Weight—In most cases, replacing generators or ordinary batteries with A. M. Power Units will mean a considerable reduction in weight . . ."
>
> • • •
>
> "Wide Temperature Range—While A. M. Power Units must be activated at temperatures above the freezing point of water, they can be successfully discharged at ambient temperatures as low as –60°F. The heat produced within the battery keeps it from freezing. Temperatures as high as 150°F. are not detrimental" (PX-18, R. 454-456, 86).

The foregoing published accolades by the Government, its suppliers and battery experts show that the Adams battery system performs a new and different function than any previous battery, is a significant contribution to useful knowledge and the science of electrochemistry, and is recognized so to be by these experts. It is submitted the Adams patent meets the criteria of invention as set forth in *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147.

C. Adams Flew in the Face of the Battery Art and Thereby Produced a New Battery With Unique, Unexpected and Important Results

(1) *The Adams Battery Is New*

The Court below has found that:

> "22. Each of the elements of the several claims of the Adams patent was individually old in the battery-making art at the time of the filing of the Adams application for the patent here in suit. While there is evidence of a definite need for a battery having the characteristics of the Adams battery, those skilled in the art failed to develop one for a period of over 50 years, during which time all of the necessary ingredients were available. There is no evidence that anyone had ever before suggested the specific *combination* of elements which make up the Adams battery nor that anyone had ever before suggested that such a battery would have a substantially constant potential, could be operated under extreme temperatures, and could be operated with ordinary or distilled water." (R. 704).

The Record supports the above finding.

The "boneyard of failures"[21] which composes the Government's collection of ancient prior art shows that the art had long wanted a battery in which magnesium could be employed as an electrode.

From the time magnesium was discovered in 1854 (R. 120, 382; DX-19, R. 591, 381), the art made many attempts to use it in a primary battery because of the position of magnesium on the electrochemical chart (R. 360-1). But magnesium is highly corrodible[22] (R. 243, 295; DX-12, R. 565, 381; R. 363, 388; PX-39, R. 467-8, 251), and although many recommendations were made that magnesium be used as an electrode in primary batteries, (*Ibid.*, R. 360-1, 295) it was always on a theoretical basis that did not solve the corrosion problem (R. 243, 295). There are very few practical batteries today that employ magnesium as a component. The

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[21] *Reynolds* v. *Whitin Mach. Works*, 167 F.2d 78, 84 (4 Cir. 1948), *cert. denied*, 334 U. S. 844.

[22] Which means it is destroyed chemically by the other constitutents of conventional Voltaic cells before it can deliver its available electrical potential (DX-12, R. 565, lines 48-53, 381).

Government has supplied us with a chronological catalog of failures extending over the years.

The Government has cited British Patent No. 4341 to Skrivanoff (DX-19, R. 591, 381), issued in 1881. Dr. White said this represented an early attempt to build a bell-ringing primary battery (R. 370) which automatically distinguishes it from the Adams system. Skrivanoff employed magnesium (DX-19, R. 591, 381; R. 371). Dr. Mantell, who duplicated the Skrivanoff disclosure, suffered two fires and an explosion before he became discouraged and concluded that the battery was inoperative (R. 388). The Court below agreed that:

> "17. The Skrivanoff foreign patent discloses a battery having an electrode of magnesium, an electrode comprising cuprous chloride *mixed together with* some *seven* other substances, and a strong electrolyte. The evidence establishes that the disclosure of this very old patent is inoperative." (R. 703). [Latter emphasis ours]

The Government also cited U. S. Patent No. 1,696,873, issued to Wood in 1928 (DX-12, R. 565, 381), which mentions magnesium for the time-honored reason that magnesium is near the top of the electrochemical series (*Ibid.*, R. 360-1). In his patent, Wood stated that if magnesium were used "one or more strong oxidizing agents" would *have to be added* to the electrolyte *to mitigate corrosion*[23] of the magnesium (DX-12, R. 565, lines 54-65, 381). This "reference" thus teaches that if magnesium is to be used as an electrode, a special oxidizing agent must be added to an already complex electrolyte. The Wood patent also states ". . . it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode" (*Id.* at lines 12-15), and also that: "magnesium will corrode so rapidly in ammonium chloride solution that the cell becomes valueless in a few hours, even on open circuit. *The same disadvantage applies to all the commercially used primary cell electrolytes.*" (*Id.* at lines 48-53) [Emphasis ours] Thus the art *was pointed away from magnesium* because of the special corrosion problems.

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[23] The problem Adams solved by *adding* nothing, but ignoring 140 years of research on conductive electrolytes, and experimenting with plain water. See also DX-19, R. 591, 311; R. 594, 383, 243.

Then in 1937 came Jumau, U. S. Patent No. 2,078,143 (DX-14, R. 572, 381) which mentions magnesium (*Ibid.*, R. 361-2). The Government expert who testified concerning it, admitted that the Jumau patent teaches that acid or basic electrolytes will attack magnesium (R. 363). This patent was tried by Dr. Mantell who reported that the battery was inoperative (R. 388). One may properly ask—what does an inoperative disclosure teach the art? The significance of Jumau is that it teaches that 2 years prior to Adams, no one, after a half century of effort, had learned how to use magnesium in a battery.

Even today, the Adams battery system is one of the few successful systems using magnesium as a component. In 1946 in referring to prior art batteries, employees of one of the Government's contractors stated in a published statement th

> "No work had been done on use of other negatives such as magnesium to increase the voltage of such a system and render it more widely useful." (PX-39, R. 468, 251)

Not only did the Government fail to refute this on the record, but the Government's own expert agreed with the statement (R. 362).

The other electrode substance employed by Adams was cuprous chloride, which had been suggested for use in batteries four times between 1880 and 1895 (R. 382; DX-18, R. 589, 381; DX-19, R. 593, 381; DX-20, R. 597, 381; DX-21, R. 608, 381) and not since. Cuprous chloride is poisonous (R. 121) and sometimes produced disastrous results when employed in batteries (R. 388; DX-19, R. 591, 381). It, too, is insoluble (R. 121, 123, 266, 263, 264) and destroyed by conventional acid electrolytes (DX-18, R. 589, line 97—R. 590, line 8, R. 381). There is no evidence that any practical battery had ever been made employing it.

Moreover, chance played its part in the employment of cuprous chloride. The discovery of the role of carbon as a catalyst in the cuprous chloride electrode was due to Adams accidentally dropping cigarette ashes in the mix (R. 43-4, 106, 698). By inspiration, he deduced that it was the carbon in the ash that was effective, and then determined by trial and error that all kinds of carbon were effective (R. 45, 106-7) in the cuprous chloride electrode.

Thus, the making of the Adams battery was not a mere act of "selection". When Adams discovered his ingredients he disregarded conventional battery theory, chose to combine materials that no one else in the battery art could get to work even one at a time, and finally was handed a catalytic combination by Lady Luck.

However, Adams was not experimenting blindly for he had his own theory. To use highly corrodible magnesium, he reasoned that one could activate only with a chemically unreactive liquid (R. 49, 40) that would not destroy the magnesium chemically before it could produce electricity in the electrochemical couple. Water is chemically neutral (R. 49, 40). However, water could not work according to traditional theory because magnesium is insoluble in water (R. 264) and so could not react, and even if it did produce electricity, the water could not conduct it (R. 277-8, 217, 264). But Adams believed magnesium was soluble in water (R. 41) and so could react, thus affecting the second electrode, and he perservered with many experiments (R. 40-1, 105-7) until success crowned his efforts and he discovered the electrochemical couple of magnesium and cuprous chloride.[24] (R. 41, 66). He succeeded because he followed his own theory and concepts and disregarded conventional theory.

Moreover, the Adams battery is the only battery that has ever solved the problem of utilizing the desirable properties of water as a substitute for electrolytes to activate a primary battery. (R. 209, 691, 704).

In his initial experiments reported in 1800, Volta attempted to employ water and found that it would not function as an efficient electrolyte, and therefore directed the attention of the art into the field of conducting electrolytes (PX-42, R. 500-1, 281; R. 217). Plain water, of course, is an insulator (R. 277-8, 217, 264) and will not conduct electricity *(Ibid.)*. In 1880, Niaudet reported a water battery (DX-1, R. 507-8, 380) but stated that it was of "little interest" until De La Rue used a solution of sea-salt or sal-ammoniac in the battery (*Id.* at 508) to impart conductivity. Thus, he reaffirmed Volta's theory and reasserted the need for conductive electrolytes.

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[24] He also discovered that silver chloride would work (R. 41) and told the Government about it in 1942 (R. 66).

Since that time the art is replete with examples of unsuccessful efforts to obtain a battery that could be activated with plain water. These attempts usually took the expedient of placing a soluble dry metallic salt between the electrodes or in recesses in the battery case or container to impart conductivity to the added water. One example of this, out of the many available, is provided in Defendant's Exhibit 5 which is U. S. Patent No. 405,196, issued to Barrett in 1889 (DX-5, R. 531, 380). In this battery, a zinc sulfate material was used in dry form and as Barrett states in the patent:

> "I prefer to charge the battery with the sulphate in a dry form, and for this purpose I impregnate the porous diaphragm between the zinc and silver elements with the salt by boiling or saturating the diaphragm with a saturated solution of the salt, after which the liquid is evaporated, leaving the salt in a dry or inactive state. The porous diaphragm may then be in contact with both elements without producing action, while the addition of water will at any time put the battery into an active condition." (DX-5, R. 532, l. 97—R. 533, l. 8, 380)

The Barrett reference indicates that from at least 1889 the art had sought the end achieved by Adams, without ever dreaming that ordinary water, without salts or other chemicals, could function alone.

That the need and desire continued to exist is shown in Defendant's Exhibit 11 "Primary Cells" by Codd, published in 1929, wherein it is stated:

> "*Inert Cells.*
>
> Before terminating this chapter, mention must be made of an important branch of dry cells, that is, the inert cell, which is virtually a dry cell put up without the moist paste in place, and with one of the vent holes enlarged to form an opening large enough to carry a small cork (Fig. 40). Although the paste is omitted as such, the excitant salts are left in place within the cell, and in some cases the desiccated components of the jelly. Under these conditions the cell will store in good condition for very long periods, and when it is required to put the cell in action it is only necessary to add water through the vent (having removed the cork) till the cell is full, using for the purpose a small glass syringe similar to that used to fill a fountain pen." (DX-11, R. 559, 380)

Codd shows the art was desirous of having a battery that could be activated by plain water as late as 1929, but did not know how to accomplish it.

Adams solved a problem that had puzzled the experts since earliest times. Adams' solution to the puzzle is admittedly simplicity itself; a battery comprising an anode of magnesium, a cathode of cuprous chloride, the battery adapted to be activated by plain water. But a solution of such simplicity, in the face of the repeated attempts and failures of those skilled in the art to solve the problem, is strong evidence of inventive genius.

In *Baldwin-Southwark Corp.* v. *Tinius Olsen Testing Mach. Co.*, 88 F. 2d 910, 914 (3rd Cir. 1937), *cert. denied* 302 U. S. 696 the Court of Appeals stated:

> ". . . Indeed the simplicity of a device, instead of minimizing its inventive character may be an evidence of invention. In that regard this court, in Aronson *v.* Toy Devices, Inc., 1 F. (2d), 91, 92 said: 'Mere simplification of a substantial character, disposing of parts which have long been in use, may amount to invention. *"To obtain simplicity is the highest trait of genius."* [Citing cases]'" (Emphasis ours)

That Adams solved the old problem of employing magnesium and cuprous chloride in a practical battery capable of activation by water is evidence of invention. That his solution was one of such astonishing simplicity in a crowded art is *evidence of genius.*

(2) *The Results of the Adams Battery Are Wholly Unexpected and Different From Any Other Battery*

Having deliberately combined the ingredients to make his wholly novel battery, Adams flew in the face of the art in recognizing its peculiar operating characteristics as being beneficial rather than self-destructive. Most prior art batteries were generally capable only of intermittent use (R. 217, 115, 118) and could not supply continuous, level current at temperature extremes. Such batteries, if used continuously, had an extremely short life (R. 217), and their voltage and amperage declined (sometimes linearly, but never without some slope) during each instance of use (R. 217; PX-38, R. 228, This Brief, p. 51).

Important evidence of an efficient battery of the prior art type was that during periods of inactivity "local action" was minimized or did not occur (R. 131; DX-1, R. 510, 380). This meant that the chemical activity ceased (R. 131-2). An advantage of prior art batteries was that they provided an instantaneously available source of power when connected to a load. That is why Dr. Mantell and Dr. White called them "bell ringers"—when the button was pushed the current was immediately available (R. 132, 145, 370). More important the battery went off when the button was released (R. 145, 132).

When Adams put his cell together, looking at it and him in the year 1940, from the point of view of traditional battery theory, it is clear that he defied convention in everything he did.

First: When the Adams battery is constructed, the water added, and the terminals connected to a load to complete the circuit, what occurs? In terms of traditional theory, a battery should deliver its power instantly (R. 217, 145). In the Adams battery *nothing* happens for as long as thirty minutes.[25] (TX-10, R. 395, col. 2, lines 2-6, R. 11; TX-12, R. 406, 11). It is possible that in the half century before Adams, the Adams combination was tried. One may speculate how many times it was *thrown away* because power was not delivered during the period of time the patience and acuity of the experimenter allowed. Scientists thinking in terms of a better conventional battery would discard the combination. Not delivering power promptly, it was not a battery (R. 145, 217).

Second: Adams continues to work—the battery is now generating power and he observes that the water solution is beginning to heat up and, after a short period of time, if the battery is connected to a high load, *the water begins to boil* (R. 260-1). In terms of traditional theory, an overheated battery is building internal resistance, losing its efficiency and destroying itself (R. 216-7; PX-16, R. 450,

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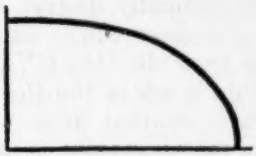
[25] *The same thing happens in the batteries the Government procures.* (R. 156-7). The instructions on TX-7 (R. 10), an Army battery states that battery is ready for use *29 minutes* after adding water. (R. 156-7). *This is the exact amount of time (less 1 minute) the Adams' patent* states a water-activated battery will take to activate without special measures (TX-10, R. 395, col. 2, lines 2-6, R. 11).

85). Every prior art battery when it began to overheat was losing its ability to deliver current as it destroyed itself internally (R. 216-7). In the Adams battery the heating in no way lowers the operating efficiency of the battery one iota and, in fact, is now known to be a side reaction (R. 260; CX-2c, R. 444, 8; CX-2b, R. 441, 8), which was immediately understood by Adams in 1940, and by Adams alone, to provide the heat source which would make this battery the first one that would ever operate efficiently at temperatures almost 100°F. below the freezing point of the water with which it was activated (R. 68-9, 260). Traditional battery experts believed this exothermic reaction made the battery useless (PX-16, R. 448, 85; R. 216-7). This is the first battery whose performance is unaffected by cold. This characteristic, which is possessed by no other battery even today, renders the Adams battery uniquely able to survive and efficiently deliver power in the arctic and high in the stratosphere where temperatures go down to 60 degrees below zero (R. 114; CX-2, R. 446, 8; PX-19, R. 459, 88). And this is where the Government uses it, in its meteorological balloons that radio weather information down to earth from the stratosphere and in its arctic and cold weather equipment (CX-2c, R. 445, 8; CX-2b, R. 442, 8; TX-2, R. 390, 10; CX-2a, R. 439, 8; R. 257-9; PX-37, R. 463, 202). The Adams battery has made effective the modern science of meteorology. If you have flown in commercial or military aircraft in the last ten years, your course, altitude and safety were determined by information radioed down to earth by the power of Adams batteries.

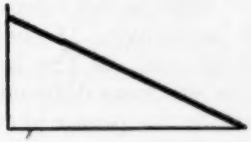
THIRD: Adams perseveres, and the battery generates current and reaches a peak for both voltage and amperage which it maintains, however *it does so whether the external circuit is connected or not.* Disconnecting the load does not turn off the Adams battery as it does in conventional batteries. When the load is disconnected, the battery goes right on boiling, generating current and ultimately uses itself up (R. 114-5, 118). Thus, the battery lacks the great advantage of conventional batteries because it cannot be turned off and a scientist looking for a better conventional battery would conclude that this battery was unsuitable (TX-12, R. 406, 11; R. 216-7, 114-5; PX-16, R. 448, 85). Here Adams recognized the advantage in the disadvantage. Although the battery was self-destructive in terms of non-con-

tinuous use, it provided continuous power without loss of efficiency which no battery had ever done before (R. 115-6, 145-6). Traditional battery experts believed this self-destructive operation made the battery useless (PX-16, R. 450, 85; TX-12, R. 402, 11; R. 216-7). Adams recognized it to be the first battery that effectively and efficiently delivered *continuous* electrical power (TX-15, R. 416, 413).

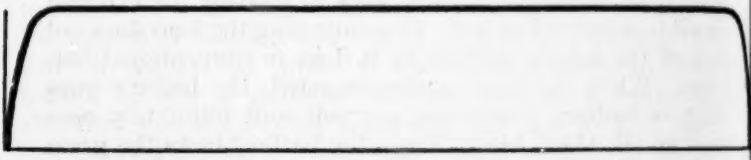
FOURTH: Adams now connects the terminals of his boiling battery to an ammeter and a voltmeter to measure the current flow under load and records it.[26] The readings show that all during its useful life this battery generates absolutely, mathematically level power (*Ibid.*, R. 44). Every prior art battery shows a decline in current delivery under continuous use (R. 217; PX-38, See this Brief, p. 51, R. 473, 251). Graphs of their power delivery look like this:



or like this



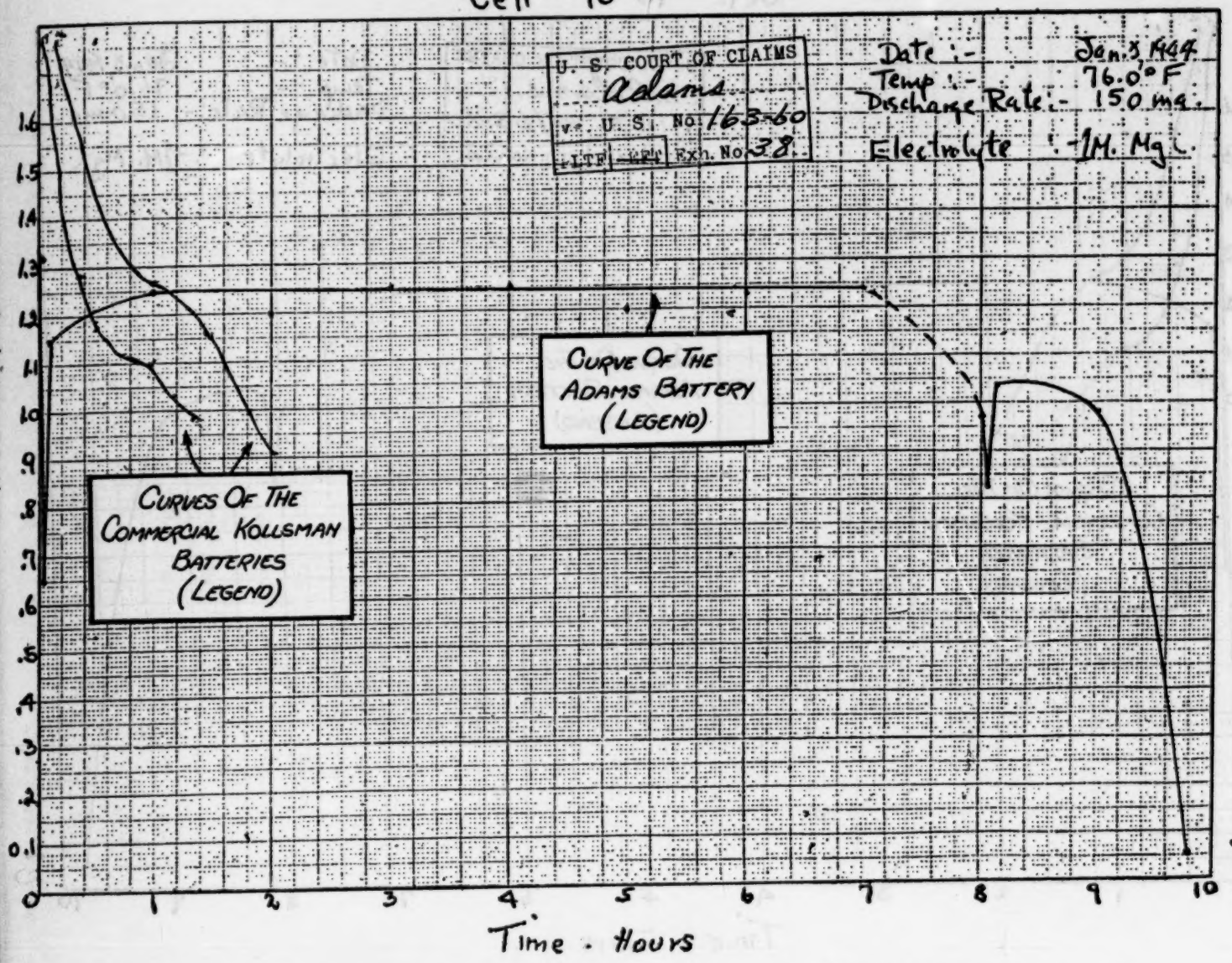
An Adams battery delivers power[27] like this:



[26] Mrs. Adams generally did this. Her very human story of her husband's experiments, triumphs and defeats should not pass unnoticed (R. 105-107).

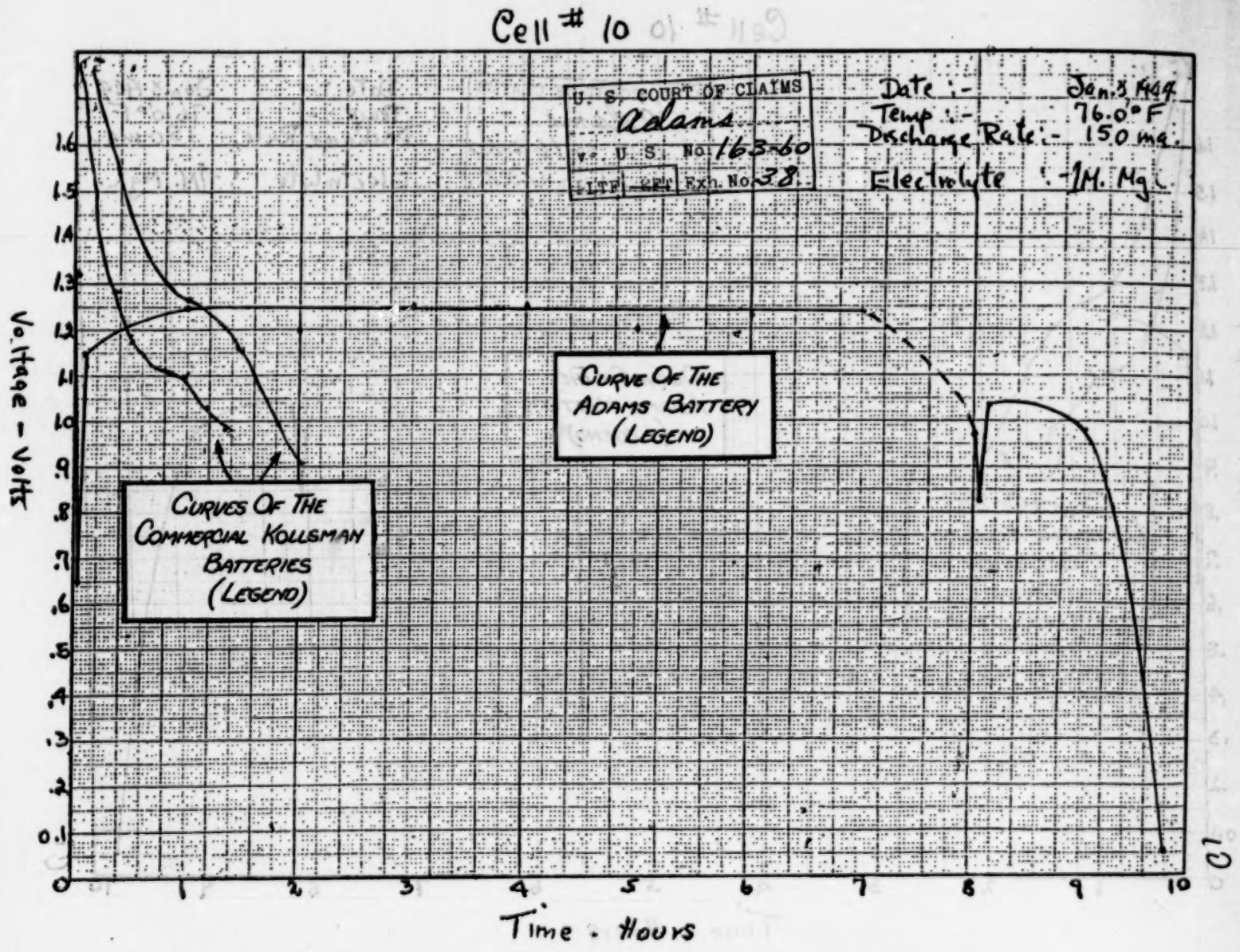
[27] See TX-15, R. 419, 413; PX-37, R. 465, 202; PX-38, see this Brief, next page.

Cell # 10



CERTAIN LINES ACCENTUATED TO FACILITATE REPRODUCTION

LEGENDS ADDED



CERTAIN LINES ACCENTUATED TO FACILITATE REPRODUCTION

LEGENDS ADDED

This is the first battery that does not get tired as it grows old. Is this surprising? No other battery can do it (R. 217, 115, 145). Furthermore there is no known battery theory that will explain this constant level delivery of power (R. 208, 695).

This single characteristic makes the Adams battery more useful for powering conventional and unconventional electrical and electronic equipment than any other known battery (R. 210-11; PX-18, R. 458, 87; R. 115-6, 199, 292-3, 704; CX-2, R. 440, 8).

In 1943, a man named Shorr, who was a scientist at the Army Signal Corps Labs. in Ft. Monmouth, was given a copy of the Adams patent (R. 219-20). He built a battery following only the directions in that patent and plotted a graph of its power delivery (R. 219-21). At about the same time he tested two commercial Kollsman batteries of the type then being procured by the Government for high-altitude research (R. 226-7). At the trial the results were cross-plotted on the same graph as Shorr had plotted the results of the Adams battery. This is Plaintiffs' Exhibit 38 (see opposite page, where it is reproduced.)

The graph speaks for itself. The experimental Adams battery delivers 20 times as much power as the commercial battery, and delivers level power, while the decline in power of the commercial batteries presents a sad contrast.

This is *the real prior art* and the contribution of Adams stands out starkly in contrast to it. Is it any wonder the Government now uses Adams batteries for high altitude research? (CX-2c, R. 445, 8; CX-2b, R. 442, 8; TX-2, R. 390, 10; CX-2a, R. 439, 8; R. 257-9; PX-37, R. 463, 202). Is it any wonder Adams batteries have been heralded as unsurpassed for low-temperature, high-altitude applications? (R. 254-7; CX-2a, R. 439, 8).

It is submitted to be clear on this Record that Adams flew in the face of the art and in the face of common sense in combining the ingredients that should never have worked; and then in recognizing that the peculiar, unusual and wholly unbattery-like results produced were the indicia of the first new battery since Alessandro Volta. As the Court below so rightly said:

> "The evidence presented during the trial shows that although the necessary materials and techniques

were available to the battery experts for over 50 years, no one put them together, or recognized that the *combination* would work, or yield new and unexpected results." (R. 692)

"The battery disclosed in the Adams patent is made up of *particular* components which *unexpectedly* produced a battery having *unique* characteristics." (R. 694) (latter emphasis ours)

"Adams selected *specific* components from the group of known battery components and found that the *combination* of these specific components resulted in a workable battery having *unique* and *unexpected* characteristics. The unexpectedness of the Adams invention is evidenced by the fact that, even today, the theory upon which the Adams battery operates is unknown." (R. 695). (latter emphasis ours)

In summary, the Court correctly found:

"22. Each of the elements of the several claims of the Adams patent was individually old in the battery-making art at the time of the filing of the Adams application for the patent here in suit. While there is evidence of a definite need for a battery having the characteristics of the Adams battery, those skilled in the art failed to develop one for a period of over 50 years, during which time all of the necessary ingredients were available. There is no evidence that anyone had ever before suggested the specific *combination* of elements which make up the Adams battery nor that anyone had ever before suggested that such a battery would have a substantially constant potential, could be operated under extreme temperatures, and could be operated with ordinary or distilled water." (R. 704)

"23. The Adams invention was the first practical, water-activated, constant potential battery capable of operation at low temperatures. When Adams first disclosed his invention to others skilled in the art, he did not know its theory of operation and it was received with considerable skepticism. However, this development was subsequently recognized throughout the industry as an extremely important step in rounding out the sources of battery-furnished power, and filling important, long-standing needs of both civilian and military natures." (R. 704)

It is submitted these significant findings are fully substantiated by the evidence.

D. The Adams Battery Has New Qualities and Functions That Fill Long Felt Wants

One of the recognized indicia of invention is that the device in question because of its new and unexpected results or because of its new quality or function satisfies long felt needs in the art, and yet consists wholly of components or substances long known to the art. *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 279; *Great A & P Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 151-2.

Due to its unusual operating characteristics, the Adams battery provides an effective source of power for all electrical or electronic systems which require level or constant current delivery, thereby fulfilling a want in the battery art that had been in existence for a century or more (R. 115-6, 199, 210-211; PX-18, R. 458, 87; CX-2, R. 440, 8; R. 704).

Almost every conventional electrical device requires a supply of level voltage and amperage to function effectively. The lights in one's home function at 110 volts and a minimum amperage, so do all conventional appliances, such as your refrigerator, washing machine, etc. If the voltage or amperage drops, the lights dim or go out, the refrigerator labors or automatic controls switch it off, the washing machine will not wash. Up to 1940 only an electric generator had been a satisfactory supplier of level voltage and amperage (R. 145, 115, 228; PX-38; This Brief, p. 51).

The Adams battery is the first battery that generates power *like an electric generator* (PX-18, R. 454, 87). It produces continuous power, it produces level voltage and amperage and is completely unaffected by cold down to 60° below zero Centigrade (This Brief, p. 4).

Many of the needs which the Adams battery now fills had existed for decades prior to Adams. Published statements, by a Government supplier, show the Adams battery has come to fill a lengthy list of long standing electrical needs. The Burgess Battery Company has stated (PX-18, R. 458, 87) that water-activated batteries are used in:

"Airborne electronic equipment
Meteorological equipment
Signal lights
Emergency flares
Lights for pilot balloon observations
Marker lights for floating buoys
Light units for movie work
Motors
Radiosonde units for weather observation
Emergency radio equipment
Air-sea rescue equipment
Ignition systems
Emergency lights for hospitals
Direction-finding equipment."

All of the foregoing uses are old. The need for a satisfactory source of battery power for signal lights, emergency flares and marker lights has existed for as long as men have been signalling to each other. The need for lighting floating navigational buoys, lighting and powering sea-rescue equipment and lighting life jackets has existed since earliest times. The need for powering motors and radio equipment is decades old for D-C motors and wireless telegraphy existed before the end of the nineteenth century. Conventional batteries could not fill the aforesaid needs satisfactorily. This was because the requirement in each case was for continuous power, or for level power, or for power that did not halt or decline under very cold conditions, or for very high power under any conditions, and only the Adams battery can fill such requirements, no prior battery could (R. 115-6, 199, 210-11, 292-3; PX-18, R. 458, 87; CX-2, R. 440, 8; R. 704).

Due to the level voltage produced by the Adams battery, its exceptional utility is for powering electronic equipment. The Government's contractor, Burgess Battery Company, has aptly and publicly stated this advantage as follows:

> "Constancy of voltage is an important factor in electronic equipment. In this respect AM Power Units have a definite advantage because they deliver practically constant voltage throughout their service.... Moreover, the voltage is not greatly affected by the current drain." (PX-18, R. 454, 87)

This was confirmed by Dr. Mantell in his testimony concerning the importance of level voltage and amperage delivery to prevent fading of radio electronic equipment (R. 114-5, 210-11). It is interesting to note that Adams in his

initial disclosures to the Government in early 1942 pointed out to them this precise characteristic of his battery system and its particular utility for powering radio transmitters and receivers (TX-15, R. 415-18, 423-4, 87).

Related to the foregoing is the acknowledged fact that in the Adams battery an exothermic reaction takes place (R. 114, 68). Adams immediately recognized that this made his battery useful for extremely low temperature operations. He reported that fact in his patent filed December 18, 1941 (TX-10, R. 395, lines 10-12, 11):

> "The battery is characterized by a linear potential and will operate successfully under all temperature conditions."

It is this characteristic which permits its low temperature utility and has permitted it to sweep the fields of high altitude meteorological use and arctic use (CX-2c, R. 445, 8; CX-2b, R. 442, 8; TX-2, R. 390, 10; CX-2a, R. 439, 8; R. 257-9; PX-37, R. 463, 202; PX-19, R. 459, 88) (See this Brief, p. 6), but these are very old needs. As Dr. Mantell testified, the need for meteorological information for the guidance of aircraft was great as far back as World War I (R. 259). Balloons and radios for collecting and disseminating weather information were available at that time (R. 259-60) but the battery that could survive high altitude use was lacking. The need for the battery that accomplished the effective powering of this equipment is as old as the history of navigation, whether aerial or naval. It is now admitted that the Adams battery system is unsurpassed for powering such meteorological equipment (R. 259; CX-2a, R. 439, 8; PX-19, R. 459, 88).

But the Adams battery has other extraordinary characteristics apart from producing level power continuously at any temperature. Another characteristic of the Adams battery is that it will produce its total efficiency regardless of the size of the electrical load (amperage drain) imposed on it (PX-18, R. 454, 88; R. 112-13). This was noted by Adams in his earliest disclosures to the Government (TX-15, R. 414-20, 413; R. 207). As seems to be the universal pattern in this case, published statements of the Government and its suppliers now confirm Adams' statement and hail this characteristic as a great contribution.

As the Burgess Battery Company has stated publicly:

> "Moreover, the voltage is not greatly affected by the current drain. *Increasing the current 16 fold only lowers the peak voltage from 1.60 to 1.52 per cell.*" (PX-18, R. 454, 87) (Emphasis partially ours).

Dr. Mantell affirmed this by stating that the efficiency of the Adams battery would remain constant "at medium loads, high loads, and low loads" (R. 112-3).

In the Adams battery system there is no substantial drop in efficiency through the imposition of an abnormal load on the battery, for example, an Adams battery producing 110 volts will light with equal brightness either one 110 volt light bulb or 15 such lights in series. In other words, it will deliver widely variable amperage on demand, without a material decline in voltage. Larger Adams batteries will do the same in infinite multiples. This truly remarkable characteristic has made it possible for this battery to become a light-weight power source for emergency transmitters, D-C motors, light units, and other units which require a great amount of power to function and which would normally require a great weight and volume of batteries for operation. (PX-19, R. 459, 88; PX-18, R. 454, 87; R. 253-4).

An additional unexpected effect is the curious result of imposing a combination of the two foregoing conditions on the Adams battery. When subjected to both *extreme low temperature* and *extreme high load,* the Adams battery maintains its relative efficiency (R. 118-9, 145-6). It will deliver *continuous, level* power at *extreme low temperatures* under *extreme high load* without substantial loss of efficiency (R. 112-15, 118-19, 144-6, 704; PX-18, R. 454-6, 88; PX-19, R. 459-60, 88). Dr. Mantell testified that no other battery has this characteristic (R. 119, 209). It is this unique characteristic which makes the Adams battery a source of power for more prosaic and exotic uses than any other battery. For the Adams battery can deliver its unique level *high power* under arctic conditions or as high in the atmosphere as 100,000 feet *without substantial loss of efficiency* (PX-18, R. 454-6, 88; PX-19, R. 459-60, 88; R. 113-4, 118-9, 144-6).

What other uses do the unusual characteristics of the Adams battery permit? Because the battery can operate

on water, the immersion of the battery in water can be used to trigger the battery and thus the battery can be used for emergency signalling and rescue equipment, even where the person involved may be helpless (R. 115-6, 384, 292). And according to statements published by its contractors, this is where the Government uses it, to power lights on life jackets and rafts for airmen and sailors, and to power automatic radio senders that float in the sea and reveal the location of those lost (R. 115-6, 384; PX-18, R. 454, 458, 87).

Because the battery can operate on water, it can be made to operate under water, even in the frigid arctic (CX-2, R. 439-440, 8). And this is where the Government uses it, in its submarines (R. 210, 292-3) and in sonobuoys that signal the location of unfriendly submarines and craft (CX-2a, R. 437-9, 8; R. 384). It has been justly heralded as "unsurpassed" for underwater use (CX-2a, R. 439, 8; R. 254-7).

The foregoing advantages were all pointed out to the Government's experts in the earliest correspondence with the Government in 1942 (TX-15, R. 415-418, 423). They refused to believe that it could operate. Now the Government's position is that it was obvious all along (Gov't. Brief, p. 19).

By virtue of the above, we submit it is proven that the result of the Adams battery system was a new and unexpected quality or function that was unbelievable to battery experts, but not to Adams. He appreciated and understood it immediately and recognized that it filled explicit long felt wants. Truly, the whole of the Adams battery is greater than the sum of its parts, and the result thereof is a significant contribution to useful and scientific knowledge. Adams is thereby an inventor of the first order as the Court below has properly indicated in its decision (R. 704).

E. The Adams Invention Is Not Anticipated by The Prior Art but Rather Is Validated by It

At the trial the Government cited 24 prior disclosures, some of which dated back to 1880 and most of which were prior to 1900. By citing art in which various elements of the Adams system had been individually used, the Government apparently believed it could induce the Court to find the *combination* to be old.

Such citation of numerous and voluminous references has often been taken to be in itself strong evidence of invention.

As was said in *Reynolds* vs. *Whitin Mach. Works*, 167 F.2d 78 at pages 83 and 84 (4th Cir. 1948), *cert. denied*, 334 U. S. 844:

> "Defendant has cited 21 patents as basis for its contention that complainants' invention is lacking in novelty; and this in itself is evidence of the weakness of the contention. Such a citation of so many prior patents almost always means either that none of them is in point and that the patentee has brought together for the purpose of his invention devices to be found in prior patents of different character, or that there have been prior attempts to solve the problem with which he was confronted which have not met with success . . . Patents for useful inventions ought not be invalidated and held for naught because of such excursions into the boneyard of failures and abandoned experiments."

The Court below came to this conclusion and cited the above case as support therefor. It stated:

> "The defendant has cited some 24 prior disclosures against the Adams patent. These citations, some of which date back as far as 1880, show that each of the elements of the Adams battery was well known in the battery-making art at least 50 years before the Adams application for letters patent. Adams, after all these many disclosures, put together the specific *combination* of elements that resulted in a lightweight cell which could be exposed to extreme temperature conditions and which, upon activation by water, produced a constant electric potential. The volume of the prior art points to the novelty of the Adams invention. It has been frequently held that voluminous prior art indicates that none of the prior art is in point or indicates that prior attempts to solve the problem have not met with success." (R. 691)

It will be established that the voluminous ancient art cited by the Government provides the strongest evidence of invention, (*Smith* v. *Snow*, 294 U. S. 1, 17) since it shows the long existence and availability in the art of all the ma-

terials and elements used by Adams to construct his batteries, and the inability of the art to discover how to use them even singly. Despite the great long-standing need for batteries capable of delivering level power, or capable of delivering continuous power, or capable of functioning at low temperatures, no one prior to Adams put these elements together, or suggested that they should be, or ever imagined or suggested that any combination of elements could produce a battery having such completely new and different characteristics from all prior art batteries (R. 704).

The Court below held that this was the fact here. It stated:

> "The evidence presented during the trial shows that although the necessary materials and techniques were available to the battery experts for over 50 years, no one put them together, or recognized that the *combination* would work, or yield new and unexpected results. Further, the evidence shows that the invention constituted an important advance in the art and has had many successful uses. The courts have recognized that obviousness is negated where the patent teaches a solution which has long eluded the researchers in the art, even though all the elements required to provide the solution have been readily available." (Citing and quoting from *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275) (R. 692).

The art cited by the Government, the art cited by Adams, and the testimony of Record provide this Court with the historical background necessary to evaluate and validate the invention. It was on the basis of just such an historical review of the art and the attempts and failures therein delineated that the Court below decided that Adams was an inventor.

An analysis of the art shows there is no patent or article cited by the Government which teaches the combination of elements used in the Adams battery to produce his new electrochemical system. (R. 704)

The breakdown of the Government's art is as follows:

(1) Nine of its anticipatory references (DX-2 through DX-10)[28] disclose batteries with zinc and silver chloride

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[28] DX-2, R. 515, 380; DX-3, R. 519, 380; DX-4, R. 525, 380; DX-5, R. 531, 380; DX-6, R. 534, 380; DX-7, R. 539, 380; DX-8, R. 543, 380; DX-9, R. 546, 380; DX-10, R. 549, 380.

as components. None of these disclose the use of magnesium, cuprous chloride, or activation by plain water. All of these were characterized by Dr. White, the Government's expert at one point or other in his testimony, as history, or *another* attempt to improve the silver chloride battery.

He referred to DX-1 (R. 505, 380) an 1870 publication, as a history book (R. 346), to the Hayes patent of 1880 (DX-2, R. 515, 380) as an attempt "to improve the so-called chloride of silver batteries which apparently had been well known for some time" (R. 347). White pointed out that DX-3 (R. 519, 380), another old text book, indicated the silver chloride battery of an earlier reference (DX-1, R. 505, 380) had to be modified to be practical (R. 349). The modification consisted in adding a conductive electrolyte (R. 349). To the same effect were his comments on DX-4 (R. 525, 380), an old text by Carhart (R. 350-1).

Both DX-5 (R. 531, 380), the Barrett patent, and DX-6 (R. 534, 380), the Hard patent, were characterized as "another method of applying silver chloride" or "an improvement in an existing battery" (R. 352-3). To the same effect were his comments on DX-7 (R. 539, 380) and 8 (R. 543, 380) (R. 354-5) and finally in relationship to DX-9 (R. 546, 380), the old Fink patent, Dr. White summed up as follows, "This is another attempt to improve the so-called chloride of silver batteries" (R. 355). The import of all of this testimony was that there were not any good silver chloride batteries, and the last one was patented in 1894. There is no evidence such batteries have been used since that date. The Mullen and Howard reference cited to the Court by Adams was published in 1946 and discussed these silver chloride batteries, as follows:

> "The usefulness of silver chloride as a depolarizer has not previously been exploited further than use as reference electrodes and one type of voltaic cell. This cell was of the pasted silver chloride-zinc type made similar to the Leclanche dry cell. Probably the main reason for lack of exploitation was due to low voltage of 1.0 volt per cell and low ampere discharge rates. No work had been done on use of other negatives such as magnesium to increase the voltage of such a system and render it more widely useful . . ." (PX-39, R. 467, 468, 251)

(2) Four of the Government's anticipatory references (DX-12, 13, 14 and 17, R. 565, 381; 568, 381; 572, 381; 587,

381) disclosed batteries with magnesium as a component. *None of these references disclose the use of silver or cuprous chloride alone as an electrode* and all of them disclose that it is difficult to use magnesium in a battery. Each one successively in point of time shows that the previous one failed to solve the problem of employing magnesium in a battery. There is no evidence that any of these batteries operate or are presently in use.

(3) Three of the Government's anticipatory references (DX-18, 20 and 21, R. 589, 381; 597, 381; 601, 381) disclose the use of cuprous chloride in conjunction with mixtures of other materials, including acids and bases which would destroy its chemical identity (R. 383-4). None of these references disclose the use of cuprous chloride alone (or mixed with carbon) or its use in conjunction with magnesium. The dates of these references are 1895, 1891 and 1888. There is no evidence that any of these batteries operate or are presently used.

(4) Two of the Government's anticipatory references disclose the use of neither magnesium, cuprous chloride nor silver chloride (DX-22 and 23, R. 615, 381; 618, 381).

Therefore a total of 18 of the Government's anticipatory references disclose either none of the components of the Adams system or one single component of the system. None of these 18 references disclose the combination.

To remedy the devastation to its own case caused by its shotgun approach to the art, the Government now rests on four references, as follows:

1. The 1880 patent to Skrivanoff (DX-19, R. 591, 380) referred to in the Government's brief at pp. 8, 15-18.

2. The 1880 textbook of Niaudet (DX-1, R. 505, 380) referred to obscurely as "an 1880 treatise" in the Government's brief at p. 7.

3. The 1883 patent to Hayes (DX-2, R. 515, 380) referred to in the Government's brief at p. 7.

4. The 1929 textbook of Codd (DX-11, R. 553, 380) referred to in the Government's brief at pp. 17, 21 as a "1929 treatise".

In its brief the Government argues these references at face value. It never informs this Court of what the

testimony showed concerning them, or what other references put into the record by both Adams and the Government taught concerning them, their operativeness, and what they taught the art, if anything. From the Government's Brief one would think there had never been a trial. The Government asks this Court not to take over the fact finding function of the Commissioner or the Court of Claims, but rather to take over the function of an *ex parte* patent examiner.

On the above references it alleges first that the Adams combination is not *new*, citing 35 U. S. C. § 101. But the Government had admitted all along, up until now, that the Adams combination was specifically new. In its Petition (p. 11) it stated:

> "It is true that Adams put together elements not actually combined before and obtained more favorable results, for some purposes, than had prior combinations."

The Government urges that the Skrivanoff reference shows the Adams combination is not *new*. But Skrivanoff, if it works, is a "bell-ringing" battery (R. 370, 591). It will not give continuous, level power at any temperature and it shuts off when you release the bell. Thus, its operating characteristics are entirely different from Adams (R. 145, 132, 370).

If Skrivanoff's battery had Adams' combination, it would have Adams' characteristics. However, the Government says in its brief, "The Adams claim was, in essence, the combination of magnesium and cuprous chloride as the principal functional elements of the electrodes, and in this respect Skrivanoff *fully anticipated* Adams." (Govt. Brief, p. 16) [Emphasis ours]. Thus the Government's position is that Skrivanoff teaches (1) a magnesium electrode and (2) a cuprous chloride electrode. Let us analyze these in reverse order.

First, it is not true that the Skrivanoff patent teaches cuprous chloride as one electrode. The electrode in Skrivanoff is a *carbon* or *copper* electrode faced with a paste of phosphoric acid, amorphous phosphorous, metallic copper in spangles, and cuprous chloride, mixed together with sulfuric acid and applied *hot* to the carbon and covered

with blotting paper impregnated with concentrated zinc chloride and sulfuric acid (R. 593).

Dr. White, the Government's expert refused to state that the Skrivanoff electrode mix still contained cuprous chloride after being mixed with phosphorous and sulfuric acid, as follows:

> "Q. Have you any information as to what the residual product, after the combination is made, would contain, and would it still contain cuprous chloride?
> "A. I have the disclosure of the patentee, and that is all the information I have." (R. 383-4)

There is no evidence in the case that the Skrivanoff electrode, when completed, contains cuprous chloride.

Further, the so called "cuprous chloride" electrode of Skrivanoff caught fire when put together. Adams' expert tried to make the Skrivanoff electrode (The Government's expert did not (R. 383)) and stated:

> "Q. Doctor, did you test or put together the combination described in the Skrivanoff patent concerning the mixture shown on page 2?
> "A. I tried to put the mixture shown on page 2 of the protochloride of copper, phosphorous, amorphous, phosphoric acid, and metallic copper, in spangles. It says that sulphuric acid has to be added to give the paste a sufficient consistency. I had two fires, and blew the side out of a vent." (R. 388)

One may properly ask, how much would one learn about cuprous chloride as an electrode material from the above experience? The answer is given by the Government's own cited case:

> "And a prior unsuccessful experiment does not constitute invention and cannot therefore be an anticipation." *Pacific Contact Labs., Inc.* v. *Solex Labs.*, 209 F. 2d 529, 532 (9 Cir. 1953), *cert. denied*, 348 U. S. 816. See also: *Smith* v. *Snow*, 294 U. S. 1, 17.

Lastly, the Government argues that Adams teaches mixing carbon and cuprous chloride (Gov't. Brief, p. 15) and therefore is like Skrivanoff's mixture of seven substances. But Adams' Claim 1 does not include carbon. The answer to Skrivanoff is, of course, that Adams is not like Skrivan-

off in any respect because, with or without carbon, Adams (1) doesn't explode, and (2) works.

Second, it is not true that Skrivanoff teaches the art how to use magnesium in a primary battery. Dr. Mantell's testimony on what happened to him when he made the electrode containing seven materials plus cuprous chloride, is recounted above. Now let us find out what happened to him when he also took magnesium and tried to put the entire battery together. He testified:

> "When I took the mix which was made and tried to make a battery, and then added the electrolyte on the other side, concentrated chromic acid, and then added potassium permanganate, I did not know what I had because it blew up." (R. 388)

The true relevance of Skrivanoff is that it is another ancient failure. It is part of the historical background showing the confusion in the art prior to Adams.

Other and later art put in by the Government showed that the art, prior to Adams, never learned how to use magnesium in a primary battery. The Government cited the 1928 patent to Wood (DX-12, R. 565, 380) which taught, as of that date, that "it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode" (R. 565) for the reason that it corrodes too rapidly in electrolytes (R. 565). Next the Government cited the 1929 Codd textbook (DX-11, R. 553, 380) which it asserts teaches the substitution of magnesium for zinc in a conventional cell using sulfuric acid as an electrolyte (Govt. Brief, p. 21.) This is not true. What Codd is showing is a test method of measuring electromotive force. In a test cell it is only necessary that the magnesium survive for a matter of seconds in order to permit a measurement of the electromotive force to be made. There is no teaching in Codd, as of 1929, that magnesium could be substituted for zinc in a practical battery. This is proven by the later Jumau patent of 1937 (DX-14, R. 572, 380) which taught that magnesium cannot be used with an acid mix. Jumau states "it is, therefore, not necessary to use an acid or basic electrolyte which would *attack the magnesium* in open circuit." (R. 572, col. 2, lines 12-14 [Emphasis ours]). Dr. White admitted that an acid or basic electrolyte would attack the magnesium (R. 363). This was confirmed by the

testimony of Dr. Mantell who stated that magnesium was a highly corrodible material and as of 1940 could not be used in a conventional cell (R. 243). Further, Jumau itself (DX-14, R. 572, 380) which pretended to teach the art how to employ magnesium in a battery, as of 1937, proved to be inoperative (R. 388). Adams put in the Mullen and Howard article (PX-39, R. 468, 251) of 1946 which taught that no work had been done up to World War II to solve the problem of using magnesium as an electrode in a primary cell (R. 243). It was in relationship to this reference that the Government's own expert, Dr. White, testified that *it was not within the skill of the art to substitute magnesium for zinc in 1939* (R. 362)

What does the aforesaid analysis of the Government's art on the use of magnesium prove? The Government has cited so many references by years from 1888 up to date that each one establishes that no previous reference ever taught the art how to use magnesium in a battery until Adams did so, and finally the Government's expert admitted this to be true.

What the Government's art shows is that in 50 years of experimentation, the art moved away from the direction of Adams, it never learned how to use magnesium. It was only Adams who solved the basic problem by going back to first principles and producing the first battery which did not respond to Volta's theory whereupon the problem of using magnesium was solved, the problem of using cuprous chloride successfully was solved and water suddenly became useful. All the jack straws fell into line at once. The line of patents cited by the Government stretching over a period of 50 years is the best evidence in the case that Adams is a pioneer inventor.

The Government asks where is the invention in making the Adams battery over Skrivanoff (Govt. Brief, p. 16). The answer is, in ignoring it.

As a result of all of the above, the lower Court properly found:

> "17. The Skrivanoff foreign patent discloses a battery having an electrode of magnesium, an electrode comprising cuprous chloride *mixed together with* some seven other substances, and a strong electrolyte. The evidence establishes that the disclosure of this very old patent is inoperative." (Find. No. 17, R. 703)

The next two references relied on by the Government are the 1880 Niaudet text (DX-1, R. 505, 380) and the 1883 Hayes patent (DX-2, R. 515, 380). Neither of these references shows the use of either magnesium or cuprous chloride.

Both references teach zinc and silver chloride as electrode materials. The record establishes that the zinc-silver chloride battery is an entirely different battery than the magnesium cuprous chloride Adams battery (R. 131-2). The zinc-silver chloride battery is a conventional intermittent use battery, or "bell-ringer", not a continuous action Adams battery (R. 131-2).

The Government argues it is obvious to create the Adams invention by making substitutions of "equivalent"[29] materials in Hayes. There is a difficulty with this, the Government's sole expert on the subject testified specifically that it was *not.*

On page 362 of the Record, the Government's counsel questioned Dr. White, its expert, as follows:

> "Q. I would like to ask you this question: I would like to ask *whether* in your opinion *it would be within the skill of an expert* in your field *to substitute magnesium for the* element *zinc* in the electrode C, shown *in the Hayes patent?*
>
> "A. It certainly would be.
>
> "Q. In your opinion, would it have been within the skill of one skilled in the art by around 1937 or 1938?
>
> "A. In view of all the references *except this particular one.*
>
> "Q. When you say 'this particular one' you mean what?
>
> "A. *That is the Mullen-Howard article, but I do not know the date.*" (Emphasis ours)

The Government's expert knew well from having heard the previous testimony of Dr. Mantell on the subject, (R. 243) that the Mullen and Howard article (PX-39, R. 467, 251) said that:

> "The usefulness of silver chloride as a depolarizer has not previously been exploited further than use

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[29] The non-existence of equivalency of the relevant materials is fully set forth in this Brief, p. 59.

as reference electrodes and one type of voltaic cell. This cell was of the pasted silver chloride-zinc type made similar to the Leclanche dry cell. Probably the main reason for lack of exploitation was due to low voltage of 1.0 volt per cell and low ampere discharge rates. *No work had been done on use of other negatives such as magnesium* to increase the voltage of such a system and render it more widely useful . . ." (PX-39, R. 467, 468, 250-1) (Emphasis ours)

It is clear from the above that in view of this reference (the date of which was *after* 1938, i.e., 1946), Dr. White *could not truly conclude that it was within the skill of the art* to substitute magnesium for zinc in batteries in 1937 or 1938. After this direct testimony of Dr. White, the Government never again referred to the Mullen-Howard article in any further testimony. It is submitted that it is a travesty to request this Court to find the Adams invention anticipated in view of such a Record. The Government argues the Hayes patent in its Brief, but doesn't tell this Court what *its own witness said about it.* The Government's position is destroyed by its own proofs.

The last reference relied on by the Government in its Brief (pp. 17, 21) is the Codd textbook of 1929 (DX-11, 553, 380).

The Codd reference is a lengthy text written in 1929 (R. 553). The relevant pages of Codd are brought together in the printed record purely as a result of the omission of the intervening pages (and their numbers) by printer's convention. In cataloging different batteries and discussing them, it refers to magnesium on its page 22 (R. 554) and in discussing another battery entirely on its page 44 mentions silver chloride (R. 558), and no where suggests that any one had ever put them together, or that anyone ought to put them together.

The 1929 Codd reference is probably the most devastating answer to the Government's case imaginable. For although the Government doesn't mention it, Codd, at page 78 (R. 559) in his book, far removed from his comment on *magnesium* at page 22, and far removed from his remarks on a *silver chloride* battery at page 44, discussed another type of battery and there showed that the art was still highly desirous of creating a *water* activated battery in 1929, but didn't know how to do it except by secreting an

electrolytic material in the battery prior to adding water. At R. 559 Codd states:

> *"Inert Cells.*
>
> Before terminating this chapter, mention must be made of an important branch of dry cells, that is, the inert cell, which is virtually a dry cell put up without the moist paste in place, and with one of the vent holes enlarged to form an opening large enough to carry a small cork (Fig. 40). Although the paste is omitted as such, the excitant salts are left in place within the cell, and in some cases the desiccated components of the jelly. Under these conditions the cell will store in good condition for very long periods, and when it is required to put the cell in action it is only necessary to add water through the vent (having removed the cork) till the cell is full, using for the purpose a small glass syringe similar to that used to fill a fountain pen."

Thus, in one text, circa 1929, only 10 years before Adams, a well known electrochemist mentions magnesium and silver chloride and never suggests that anyone put these substances together, or that they should be put together, or that if they were anything extraordinary would happen, or that they could be activated with plain water. It is submitted that *the vacancy of the art immediately prior to Adams'* entrance on the scene is thereby established by Codd.

However the Government urges the Codd reference in a slightly different manner. In its Petition on this subject it said that the Adams contribution resided merely in the substitution of known equivalents in a prior art battery, citing *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, 324 U. S. 320, 330. It further argued, on the same authority, that even though better results may be produced by such a means, *Dow* and other decisions of this Court establish that this does not constitute invention (Pet. p. 8). To reach this conclusion, it suggests that Codd teaches the equivalency of cuprous chloride for silver chloride and zinc for magnesium (Govt. Brief, p. 21).

As to the first, the Government is in no position to urge that cuprous chloride and silver chloride are equivalents before this Court. Before the trier of the facts, the Government opposed all of Adams' requested findings of fact

that the substances were equivalents (R. 629-33, 637-40) whereupon the trier of the facts refused to find that the substances were equivalents (R. 644-5). Neither side excepted and the Court of Claims affirmed (R. 689). It is submitted that since the Government induced the Commissioner to decide this question of equivalents as he did, that should have ended the matter. Adams has moved to dismiss the Petition herein because of the Government's reversal of position on this fact question (This Brief, pp. 88-93).

Should this Court determine that the Government has reversed its position, it is submitted that the Petition should be dismissed. Should this Court determine that the Government is free to urge equivalency, and that cuprous chloride and silver chloride are equivalents, this Court must then address itself to the issue of the Government's infringing use of magnesium-silver chloride batteries, for there is *no art that anticipates either magnesium-cuprous chloride batteries or magnesium-silver chloride batteries.* Both types of water-activated batteries are *sui generis* both as to novelty of composition and as to novelty of operating characteristics. (R. 146, 209)

As to the allegation that magnesium and zinc are equivalents, the record in this case disposes of that question. See this Brief, pp. 42-44, 64-65. The Government's own expert, on direct, stated that it was not within the skill of the art to substitute magnesium for zinc in 1939 into the Adams battery combination (R. 362). The Government's own exhibits show that as of ten years before the Adams invention, despite multiple efforts by the art, no one knew how to employ magnesium in a practical battery (DX-12, R. 565, 380), and "it has been generally accepted that magnesium could not be commerically utilized as a primary cell electrode" (R. 565, lines 12-15). Further that magnesium will corrode so rapidly in all commercially used primary cell electrolytes that the cell becomes valueless in a few hours (R. 565, lines 48-54). Even as late as 1937, according to the Government's cited art, no one knew how to make a successful battery with magnesium (R. 388; *Jumau,* DX-14, 572, 380), for Jumau was also a failure (R. 388). This situation continued to prevail up to the beginning of World War II (R. 243; PX-39, R. 467, 251). The proofs further show that magnesium and zinc are not chemical equivalents. In Defendant's Exhibit 16 (R. 582,

585, 380), it is shown that magnesium is an *alkaline earth metal.* The Government's expert so testified (R. 364) and excluded zinc from the category (R. 364). Zinc is shown to be one of the low melting metals by DX-16 (R. 585). The only thing zinc and magnesium have in common is they are both metals.

Adams' expert testified that the zinc-silver chloride system is an entirely different type of battery than the magnesium-cuprous chloride system of Adams (R. 131-2). When zinc is substituted into the Adams battery the result is a conventional intermittent use battery, another "bell-ringer," not a continuous action Adams type battery (R. 131-2). Adams himself testified that he tried zinc in his battery and it failed (R. 41). The fact testimony of both sides concurs that zinc and magnesium are not equivalents in the Adams battery system.

Moreover the fact testimony of both sides concurs that when both acts of substitution are reversed—i.e. zinc is substituted for magnesium and silver chloride for cuprous chloride, the resultant battery is entirely different in operation than the magnesium-cuprous chloride battery. A zinc-silver chloride battery is a bell-ringer, it gives intermittent power, declining current and fails in cold weather. A magnesium-cuprous chloride battery gives continuous power at a constant level at any temperature (This Brief, pp. 4-10).

Dr. Mantell, Adams' expert, testified:

> "Q. Doctor, is this zinc-silver chloride system the same electrochemical system as the magnesium-cuprous chloride-water system?
>
> "A. No, it is not. This is a bell-ringing type of battery." (R. 132)

If the substances were equivalents as the Government says they would produce the same type of battery. The reason they do not is because the substances are not equivalents.

These observations not only dispose of Codd, they also apply to and dispose of the other two references relied on by the Government, Niaudet (DX-1, R. 505, 380) and Hayes (DX-2, R. 515, 380), this Brief pp. 64-65, for both of those are also zinc-silver chloride batteries.

Later in its Brief, the Government urges Codd in another and more subtle manner. Indeed the manner is so

subtle that the Government identifies the reference only by indirection.

It says:

> "If the Adams battery contained any innovation at all, it was in the 'new' combination of magnesium and cuprous chloride electrodes." (Govt. Brief, p. 20)

and later,

> "Indeed, all the elements of the Adams electrodes appear on charts reproduced in the 1929 Treatise cited in the statement (R. 556, 562)." (Govt. Brief, p. 21)

Will this Court believe it, that despite the above statement, *nowhere* in the "1929 treatise" (i.e. Codd) is there any mention of *cuprous chloride.* It is just not there.

It may be that the Government believes this Court will note at record page 562 the listing "copper (cuprous)" and hopes that this Court will not realize that "copper (cuprous)" merely means monovalent copper. Or perhaps the Government hopes that this Court will interpret "copper (cuprous)" to be the same as cuprous chloride, which it is not.

The Government adds to the above argument by saying in its Brief pages 21 and 22 that the Codd reference (DX-11) is really a series of charts or lists and that picking magnesium and cuprous chloride from such lists, is not invention, despite "the fact that wholly unexpectedly, the battery showed certain valuable operating advantages over other batteries" and states that these facts are analogous to *Sinclair & Carroll Co.* v. *Interchemical Corporation,* 325 U. S. 327, 331, where a patentee selected his solvents from "a catalog of a chemical manufacturer" and therefore Adams is invalid. (Govt. Brief, pp. 21-22).

First, we have pointed out Codd *does not disclose* cuprous chloride.

Second, as the Government's brief notes, in *Sinclair* "the patent in suit was not the product of long and difficult

experimentation"[30] but contrary to the Government's position in its Brief, in Adams, it *was* (R. 40-53, 106-7).

Third, in *Sinclair,* the patentee admitted that he knew the *properties* of the material he wanted, and he went to a list that *he had* that showed the properties of various materials, and selected the material from it (325 U. S. 327, 332, 333) and this Court in *Sinclair* cited the *record of testimony* to prove it. Here the Government never cites the record of testimony, or anything else, to show that Adams selected any substances from a list. For the import of *all* the testimony and *all* of the Government's exhibits was that

1. No one knew how to make magnesium work in a battery

2. Everyone knew cuprous chloride was dangerous, and it hadn't been used since 1895

3. Everyone knew water could not activate a battery.

Fourth; Where is the list?

In the *Sinclair* case, as aforesaid, the patentee knew the characteristics of the substance he desired. He took a list and found the substances having those characteristics set forth in the list. Where is the list for Adams?

If there was such a list, would it not show?

MAGNESIUM: Not useable in batteries because it is destroyed by the electrolyte before it can produce electricity.

CUPROUS CHLORIDE: Not shown in the list.

WATER: Not useable in batteries because it will not conduct electricity.

As aforesaid, the several pages cited by the Government from the lengthy textbook by Codd are widely separated in the original text and brought together in the

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[30] In any event, the Reviser's Note, 35 U. S. C. 103 shows that in this respect *Sinclair* is no longer law. In referring to the last sentence of § 103 that Note states: ". . . it is immaterial whether it [the invention] resulted from long test and experimentation . . .".

printed record by elision and the omission of the original page numbers. At one page, magnesium is mentioned on a list (R. 556) and so is potassium and sodium, and if anyone puts any of those in an electrolyte, or in water, as any high school student of chemistry knows, he is either going to get a fire or an explosion (sodium and potassium) or nothing (magnesium).

At another place, many pages removed from the foregoing in the original text, Codd mentions "cuprous copper" or monovalent copper and shows it can be deposited electrochemically (R. 562). This may be a disclosure of cuprous *chloride* to the Government, but Adams can't find cuprous chloride any place on R. 562. Then at another place pages away in the book, silver chloride is mentioned (R. 563). This might have some relevance if the Government had ever called them equivalents at the trial, but it admits it didn't (R. 637).

At another place, equally removed from the others, Codd shows how the electromotive series is computed (R. 554). He refers to the Voltaic cell and shows that zinc is attacked by sulfuric acid, but shows a potential. Then he substitutes magnesium for zinc and gets a higher potential (R. 554).

Therefore, suggests the Government, magnesium is a substitute for zinc. But the Government forgets it also showed the court in another reference, the Wood patent, issued within a year of Codd (DX-12, R. 565) that:

> "it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode." (R. 565, lines 12-15) because the corrosion of the magnesium in even weak electrolytes like ammonium chloride is so rapid ". . . the cell becomes valueless in a few hours, even on open circuit. *The same disadvantage applies to all the commercially used primary cell electrolytes.*" (R. 565, lines 48-54) [Emphasis ours]

The Codd textbook teaches how to measure the potential of magnesium, a matter that takes a few seconds before the sulfuric acid destroys it. The Wood patent teaches you can't make a battery out of it. The inoperative Jumau patent of 1937 reenforces this conclusion (R. 388).

The answer to the Government's position is given by its own *reductio ad absurdum*. It should be known that

the electrochemical series (which is the "list" shown in Codd at R. 556) is merely a partial compilation of the periodic table which is reproduced in the Hopkins reference (DX-16, R. 585, 380). The periodic table has been in existence since 1859, the electromotive series came shortly after.

There, in the Periodic Table, are listed all the known elements as of 1946, 92 in number (R. 585). Even today there are only 112 known elements, and as the Government says in its Brief, of a like chart "the art knew of a finite interchangeable list of substances" (Govt. Brief, p. 18) and suggests all one has to do is to select the ones one wants and make use of their known, established and immutable properties. One might pick out 4, 5 or 6 elements from the chart, combine them and cure cancer, or choose others and conquer mortality. The Government has established that chemical invention is no longer possible. Everything is on that list someplace and all you have to do is select what you want. This one chart, brought up to date, anticipates every chemical compound that will ever be discovered.

The Government apparently does not agree with this Court's statement in *A & P* that:

> "Elements may, of course, especially in chemistry or electronics, take on some new quality or function from being brought into concert, but this is not a usual result of uniting elements old in mechanics." (340 U. S. 147, 151-2)

Sinclair stands for the proposition that one cannot pick the novel substance off a list, but *Sinclair* doesn't suggest that an inventor is anticipated by someone else's combining chemical encyclopedias *ad infinitum* by hindsight and finding that almost every chemical substance used in an invention is listed someplace. Particularly where the art not only did not teach that the substances might be put together, but affirmatively taught that they could not be used.

What is the true significance of Codd in this Case? It is known from other exhibits and the testimony of both sides that all the elements used by Adams were individually old before 1888. Finally in 1928, the Codd reference showed that somebody put *almost* all of them together, i.e., *in a book, but not in a battery.* This is the best the Government can do and it is submitted that there could be no more con-

clusive showing of the poverty of the art than this last and most heavily relied on reference.

The Government nevertheless insists that the Adams invention does not meet the condition for patentability set forth in 35 U. S. C. § 103[31] (Govt. Brief, p. 19) in that it was "obvious".

The Government's expert, however, a man with long experience in the battery field, could not explain why it had taken so long for the combination to be made, were it obvious. He was asked:

> "Q. Doctor, how is it that it took a man skilled in the art, I think you said, until 1938, to put the combination together, where all the components had been known in the art since 1888 for the last one? How do you explain the time lapse of 50 years or a half century?
>
> "A. I think this can't very well be answered. Maybe there was no need for it. Somebody has to have the need and the opportunity. I don't know.
>
> "Q. You don't know?
>
> "A. That is right." (R. 382)

It is established in this Brief, pp. 4-10, 53-57, that the need for the Adams battery existed many, many years before it was filled, and the opportunity to put together the simple components that filled it, existed for more than 50 years. What was lacking was not "need" or "opportunity" but *"genius"* and that Adams supplied.

This Court has long recognized that when the solution to a pressing problem has long escaped the art although all the elements required to fashion the solution have been readily available, invention is present and "obviousness" is negated. *Goodyear Tire & Rubber Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 279, is a leading case in point. So is *Loom Co.* v. *Higgins*, 105 U. S. 580, 591. This law has not changed in eighty years.

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[31] "§ 103. Conditions for patentability; non-obvious subject matter.

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

The decision of the Court below is in careful accord with this Court's decisions and with the Statute in that it found that the invention *as a whole* was not obvious (R. 704). It is submitted that the Court below is right. This is borne out by the fact that even after Adams disclosed the elements used in his battery, the experts in the Signal Corps Laboratories could neither believe it nor were they satisfied. They had Dr. Shorr conduct hundreds of experiments using countless combinations of different elements only to learn that it was the Adams combination, and *only* that combination, which would produce his new battery system (R. 218-227; TX-12, R. 404-6, 11). The experiments conducted by Dr. Shorr, the battery scientist employed by the Government at Fort Monmouth (R. 11) are like the prior art cited by the Government in that one of the Adams elements are selected and combined with some other elements to make a battery. The testimony on Shorr's laboratory notes discloses that none of these experimental combinations were any good and Shorr concluded that it was only the Adams battery system that he found feasible (R. 219).

What then does the prior art teach? It teaches one to experiment like Shorr and fill a notebook full of failures.

That the Adams combination is specifically new is proven by the fact that no prior art battery operates like the battery that Adams built. That it is unobvious is proven by the fact that conventional battery experts could not believe it worked when they saw it operating.

The Government has failed to answer this proposition and thereby has failed to establish lack of invention for the Adams patent.

F. The Unobviousness of the Adams System Is Further Proven by the Government's Admitted Surprise and Disbelief

In August 1950, well before the filing of this suit, Dr. Adolph Fischbach, an employee of the Battery Division of the U. S. Signal Corps at Fort Monmouth and the man with whom Adams conferred on numerous occasions in 1942 and 1943 concerning the Adams battery (R. 71, 76, 84), published an article entitled "Special Purpose Batteries" in the August 1950 issue of *Electrical Engineering*. He said on pages 701-702 thereof that:

"Work on the development of the magnesium, water, cuprous-chloride system was first started in the early part of 1946. Early tests had indicated its possibilities as a relatively inexpensive high-capacity battery. *Although the system was first thought to be impractical for battery applications due to its initial self-discharge and evolution of heat,* the Signal Corps, by continued effort in its Engineering Laboratories, developed a practical operating cell." (Emphasis ours) (PX-16, R. 450, 85)

This is an admission against interest that when Adams brought his battery to the attention of the "experts" at Fort Monmouth in 1942 they did not believe the battery was operative because it functioned continuously rather than intermittently and had an exothermic reaction. As we now know, these two unexpected results of the Adams system provide the battery with two of its most important advantages, continuous power with level or linear potential and capacity and excellent low temperature operation characteristics (This Brief, pp. 4-6). Fischbach confirmed this in the same article wherein he also said:

"Standard-type primary and secondary batteries are unsatisfactory for certain types of Army and Air Corps equipment and, consequently, special purpose batteries suitable for these particular applications had to be developed. This article describes three systems which have been found to be the most effective at the present time." (PX-16, R. 448, 85)

and later:

"Of the three afore-mentioned systems, the magnesium, water, cuprous-chloride system seems to offer the best solution for some of the specialized applications, particularly those where the battery has to be stored for long periods of time; where the battery has to be easily activated at the time it is required for operation, where the power can, or will, be used within a comparatively short time after activation; and where the capacity required per unit of weight and volume is exceptionally high. The battery must, of necessity, be activated at more or less normal temperatures (above the freezing point of water). Since heat is generated during the course of the discharge, this system can be utilized in powering equip-

ments going into cold temperatures, if the proper heat balances are maintained." (*Id.* at R. 449)

Dr. Fischbach further confirmed this in 1953 when he issued his U. S. patent No. 2,636,060 (TX-2, R. 390, 9-10) which covered the same battery as Adams patented in 1943, now in suit.

The Fischbach patent[32] states:

> "This invention relates to primary cells, of the deferred action type, using the electro-chemical system magnesium-water-cuprous chloride.
>
> "Magnesium-cuprous chloride batteries have attained considerable importance, particularly as 'meteorological' or 'one-shot' batteries, due to their high capacity per unit of weight and volume, their excellent operating characteristics even at low temperatures (linear potential and capacity), their ease of activation with water as electrolyte and their low cost of manufacture." (*Id.* at R. 390)

Thus, in his article, and in his patent, Fischbach confirms that first, he did not believe the Adams battery would work when Adams demonstrated it to him because it could not be stopped and because it boiled, and second, that Fischbach now considers it an invention and extols it in his patent and points out the same advantages of level power (linear potential and capacity) and excellent low temperature performance that Adams told him about ten years before (R. 71, 76, 84; TX-15, R. 421-7, 413).

The disbelief and lack of understanding on the part of the experts is further evidenced by the comments of Dr. Vinal of the National Bureau of Standards (TX-12, R. 401-3, 11), whom Dr. Mantell identified as "one of the outstanding battery experts in the world" (R. 217). On December 16, 1942, he is reported to have commented adversely on Adams' claims of operation at –40°F., to have criticized Adams and the graphs (curves) submitted by him because "they have been drawn with a ruler" (TX-12, R. 402, 11). Vinal stated that the Adams cell might be of the type which "runs away as a result of local action when over-taxed" (R. 216-9) and that "there is no point in saying that it is 'based on a new type of electrochemical action'" (TX-12, R. 402, 11).

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[32] This patent is assigned to the Government.

These comments show that Vinal doubted Adams' claims of (1) low temperature capability (2) level delivery of power, and (3) believed that the fact that Adams battery would deliver continuous power under load merely meant that the battery "runs away . . . when over-taxed" (R. 216-9).

Even this great battery expert, with all of his years of experience, could not believe that the Adams battery worked as described, or that the Adams cell was based on a new type of electrochemical action as the testimony now shows is true (R. 206-7, 216-7, 209, 253, 257, 264; PX-18, R. 454, 87; R. 119, 41, 698-9, 704).

Dr. Mantell commented on Vinal's views and at R. 217 made a remarkably succinct statement which summarizes the heart of the Adams case. In discussing the Vinal remark that the Adams cell which may be of the type which "runs away" Mantell said:

> "It is interesting to note that all of our battery philosophy up to this time indicated that the battery should be designed not to rise in temperature, but be designed primarily for intermittent service. That is what a battery was good for, and that when you used it in continuous service, the battery would polarize and lose voltage, and it was considered that a battery system consisted of electrodes, with electrolyte, and the electrolyte should be a conductor.
>
> "He [Adams] comes along and says: 'I don't do that,' and naturally he is received with skepticism, particularly by a man who was one of the outstanding battery experts in the world, and who has probably tested and examined more battery systems than anybody else." (R. 217)

The disbelief of the Government's experts was underlined by the reactions of Dr. Mantell to the substance of the initial Adams disclosure to the Government. At R. 206-9 Dr. Mantell was handed a copy of TX-15, pp. 1-5, the first Adams disclosure letter of January 7, 1942 addressed to the Government, and was asked to comment on each of the claimed characteristics of the Neutro Cell listed on page 2 of that letter. As to each one he stated that the claimed characteristic was true and that if he had been told in 1940 of a battery having this characteristic he would have been highly skeptical.

In summary he was asked the following:

> "Q. Doctor, if somebody had come to you in 1940 with page 2, the whole page, would you have believed what was on there?
>
> "A. I would have had considerable difficulty in making myself believe it, and I would not in general have believed it." (R. 209)

Thus we have a picture confirmed by all sources, the Government's employees, Adams' expert, the Government's contractors, independent experts and observers, to the effect that none of them could believe that this simple combination of materials could result in a new battery system and moreover that the effects and results of such a system were so astonishing that they caused further surprise and disbelief to the point where according to Dr. Fischbach the system had initially been considered impractical (This Brief, pp. 76-80).

A greater tribute to the pioneering quality of Adams' work is hard to envision. To say that this invention was obvious is to fly in the face of proof corroborated beyond any reasonable doubt.

The lower Court has expressly found that:

> "When Adams first disclosed his invention to others skilled in the art, he did not know its theory of operation and it was received with considerable skepticism. However, this development was subsequently recognized throughout the industry as an extremely important step in rounding out the sources of battery-furnished power, and filling important, long-standing needs of both civilian and military natures." (Find. No. 23, R. 704)

Once again, the Finding is fully reflective of the Record and of the applicable law.

G. Unobviousness Is Established by the Lack of a Scientific Theory to Explain the Operation of the Adams Battery System

Inventors in the employ of the Government's battery contractors, specifically the eminent Dr. Chubb of Eagle-Picher, have stated publicly in patents applied for in 1952 (PX-41, R. 494-6, 264) and 1954 (PX-40, R. 490-1, 264) that:

"The exact nature of the complex chemical current-producing reactions of this type of cell [magnesium-cuprous chloride] is not known in any substantial detail and much of the development has necessarily depended upon the employment of purely empirical methods." (PX-40, R. 491, 264).

He also stated:

"In practice, however, the reactions do not correspond to any simple theory . . ." (PX-41, R. 496, 264).

Dr. Mantell commented on the above and on his own knowledge concerning the Adams battery system and in relation to Dr. Chubb's remarks stated:

"He goes on in effect and says:

'We don't have an adequate theory and we do not have any positive evidence which would say: "All right, all you have got to do is to put them together and you will know what will happen." ' " (R. 263)

Directly thereafter Dr. Mantell testified as follows:

"Q. Doctor, do I understand that you have said there is no theory today that will explain the operation of the characteristics of this battery?

"A. That is correct.

* * *

"Q. Doctor, was there any theory available in the art prior to 1940 from which one could have predicted the operation of this battery?

"A. I would say in 1940 it was ridiculous to take an insoluble magnesium material and insoluble cuprous chloride and combine the two with an insulator like water." (R. 264)

The corroborating evidence of Dr. Chubb and Dr. Mantell establishes that in 1940 there were no guideposts provided by scientific theory to lead one to put the Adams system together (R. 261-65). It is interesting that today, twenty years later, scientists still cannot explain the scientific theory behind the Adams system nor can they predict the effect of additions of different substances to the system. Even today development depends on empirical experi-

mentation. Adams without the benefit of any scientific theory did make the selection; this selection was certainly not obvious to those skilled in the art and in and of itself involves invention. *B. G. Corp.* v. *Walter Kidde & Co., Inc.*, 79 F.2d, 20, 22 (2d Cir. 1935).

In response to this evidence the lower court found that:

> "When Adams first disclosed his invention to others skilled in the art, he did not know its theory of operation and it was received with considerable skepticism." (Find. No. 23, R. 704)

> "The unexpectedness of the Adams invention is evidenced by the fact that, even today, the theory upon which the Adams battery operates is unknown." (R. 695)

These statements are unimpeachable and provide the strongest support for the ultimate finding that the invention was not obvious.

It is submitted that Adams is an inventor of the first order. The Government has failed to carry its burden to show otherwise. *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.*, 293 U. S. 1, 8; *Mumm* v. *Decker*, 301 U. S. 168, 171. Rather the Record shows that Adams has affirmatively proven that his invention is the first basic advance in the battery art since Volta, and his patent is valid.

H. Conclusion as to Substantive Issues

The lower Court's decision herein should be affirmed.

III. Procedural Issues

A. Lack of Jurisdiction

A question in this case is one of jurisdiction—whether the petition for certiorari was applied for within the period allowed by law. We submit that it was not.

Title 28 of the United States Code provides in pertinent part:

"§ 2101. Supreme Court; time for appeal or certiorari; docketing; stay

* * *

"(c) Any other appeal or any writ of certiorari intended to bring any judgment or decree in a civil action, suit or proceeding before the Supreme Court for review shall be taken or applied for within ninety days after the entry of such judgment or decree. A justice of the Supreme Court, for good cause shown, may extend the time for applying for a writ of certiorari for a period not exceeding sixty days."

The Government failed to comply with the jurisdictional requirement in two respects.

First, it did not apply for an extension of time to apply for a writ until nine months after the entry of the judgment sought to be reviewed.

Second, after receiving an extension of time within which to apply, and assuming *arguendo* that the application for extension was timely, the Government failed to apply for a writ until after the extension had expired.

The chronology of relevant events is as follows:

On May 2, 1960, this suit was brought against the United States in the Court of Claims to recover upon two separate claims, (1) breach of contract, and (2) infringement of the Adams patent (R. 1).

After a full trial, on January 28, 1963, the Commissioner recommended that the Adams patent be found valid and infringed by the Government's procurement of magnesium, cuprous chloride, water-activated batteries. The Commissioner recommended that the breach of contract cause be dismissed (R. 659-661).

The Court of Claims on April 17, 1964, rendered final judgment on the patent claim, holding it valid and infringed but determined that it did not have to decide the breach of contract claim (R. 689-690).

On May 11, 1964, Adams moved the Court of Claims to alter its opinion and judgment, or for a rehearing *solely* to determine the issue of breach of contract.

Adams' motion read:

"Plaintiffs respectfully move this Court, pursuant to Rule 68, to determine the issue of the breach

of the alleged implied contract[33] and to provide for a determination of the amount of recovery under said contract claim by the trial commissioner, pursuant to Rule 47 (c) (2), and to alter or amend its opinion and judgment dated April 17, 1964, accordingly. A rehearing is prayed should the Court deem that the same would be helpful." (R. 711)

Neither party filed a petition for a rehearing relating in any way to the Court of Claims' final judgment on the patent claim.

On October 16, 1964, the Court of Claims rendered judgment that there was no breach of contract and made no change in its prior decision on the patent claim (R. 712).

On January 14, 1965, the Government filed an application with the Supreme Court for an extension of time within which to seek review of the final judgment of the Court of Claims on the *patent claim.* This was some *nine months* after the final judgment of the Court of Claims on the *patent claim* and thereby some six months late. (28 U. S. C. § 2101(c))

By order dated January 21, 1965, the Chief Justice extended the Government's time to seek a writ until February 13, 1965 (R. 714). The Chief Justice was not advised in the Government's Application, which was specifically for an extension of time to review the judgment of the Court of Claims on the *patent claim* that the "timely petition for rehearing" and subsequent decision of the Court of Claims relied on therein to toll the expiration of the time for filing were limited to the breach of contract claim.

(1) *The Government Did Not Apply for an Extension Until Nine Months After the Entry of the Judgment Sought To Be Reviewed*

When the Government filed its application on January 14, 1965, for an extension of time to seek review of the judgment of the Court of Claims on the patent claim, nine

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[33] The Footnote read:

"'Contract' as used herein is intended to include plaintiffs' allegations of express and implied contract and an unlawful taking under Article 5 of the Constitution." (R. 711)

months had already elapsed since that judgment was rendered by that Court.

It is submitted that the Government's application for an extension was thereby applied for too late to comply with the provisions of 28 U. S. C. § 2101(c) because its application and subsequent Petition related solely to the judgment on the *patent claim.*

It is established that any application for an extension must be presented within the ninety day period set forth in the first sentence of 28 U. S. C. § 2101(c). This construction of the Statute is not specifically defined therein. It is dependent on Supreme Court Rule No. 34(2).

Thus the question presented by Adams' motion herein is this:

—does the ninety day period in which the Government could apply for an extension to review the *patent claim* run from the decision of the Court of Claims on the *patent claim* entered in April of 1964,

—or does it run from the decision of the Court of Claims on the *contract claim* entered in October of 1964.

If the first, then the Government was too late. If the second, then the Government was on time in applying for its extension.

We admit that the Government had the right to apply for an extension to review the judgment of the Court of Claims on the *contract* claim when it did, but we submit it had no right to apply for an extension and file a subsequent petition limited to the *patent* claim when it did.

In *Federal Trade Commission* v. *Minneapolis-Honeywell Co.*, 344 U.S. 206, this Court held that a substantive change in a judgment not affecting the portion sought to be reviewed does not extend the time for seeking review of the unchanged portion.

A fortiori, a petition for rehearing not seeking to affect the portion of the judgment sought to be reviewed should not extend the time for seeking review of the unchanged portion. Here, Adams' motion and petition for rehearing sought only the determination of the undecided contract claim, and sought no substantive change, or any change whatsoever, in the patent portion sought to be reviewed by certiorari; thereby Adams' motion and petition should not extend the time for seeking review of the unchanged and unchallenged patent portion.

We submit that the Government's application filed in January of 1965 for an extension to review the judgment of April of 1964 of the Court of Claims on the patent claim was too late because that was the final judgment on the claim to be reviewed. The events which occurred in that Court after that judgment was rendered were of no import to the matters to be dealt with on review here.

The same situation existed in *Minneapolis-Honeywell* wherein this Court said:

> "Those statutes are not to be applied so as to permit a tolling of their time limitations because some event occurred in the lower court after judgment was rendered which is of no import to the matters to be dealt with on review." (344 U. S. 206, 213)

There is no reason why the Government could not and should not have applied for its extension within ninety days after the first judgment, rather than allowing nine months to pass. The situation here is not as it was in *Federal Trade Commission* v. *Colgate-Palmolive Co.*, 380 U. S. 374, where this Court held that the time limit of 28 U. S. C. § 2101(c) was met by filing for certorari within 90 days after the Circuit Court's second opinion.

There, this Court observed as to the first opinion of the Court of Appeals that, "*We find it inconceivable that the Commission could have successfully sought certiorari from this judgment.*" (380 U. S. 374, 383). In Adams, the same petition which the Government actually filed ten months later could have been filed as readily directly after the first judgment of the Court of Claims was handed down. This Court gave notice, by its decision in *Minneapolis-Honeywell*, that prompt filing of petitions was required. That rule should be maintained.

It is submitted that the Government's application for an extension was filed too late to comply with 28 U. S. C. § 2101(c) as construed by Supreme Court Rule 34(2).

(2) *The Government Failed To Apply for the Writ Until After Its Extension Had Expired*

After receiving the aforesaid extension of time from the Chief Justice (Order dated January 21, 1965, R. 714) granting the Government until February 13, 1965 to apply for a

writ, the Government failed to apply until after its extended period had expired.

The Government delivered its Petition to the Clerk of this court on February 12, 1965 accompanied by a Certificate of Service that was in error in that no service, or attempt at service, had yet been made.[34]

Service was not made until February 16, 1965, when copies of the Petition were first mailed addressed to counsel for Adams. This was three days after the expiration of the extended time period.

The mere act of filing copies of a petition with the Clerk of the Supreme Court is not applying for the writ within the meaning of the statute. The present rules of this Court make it clear (Rule 21(1) and (33)) that the act of applying for a writ of certiorari shall consist of service and subsequent filing of proof of service with copies of the petition.[35] Only when this has been accomplished has the act of applying for the writ been completed.

As was well said in *Federal Trade Commission* v. *Minneapolis-Honeywell Co.*, at 344 U. S. 206, 213:

> ". . . litigation must at some definite point be brought to an end. It is a principle reflected in the statutes which limit our appellate jurisdiction to those cases where review is sought *within a prescribed period.*" (emphasis ours)

It is idle to argue that the Rules of this Court as to service and filing of a petition for certiorari may be waived.

The statute, as clarified by the established Rules of this Court, constitutes the jurisdiction of this Court. It is submitted that it is no more proper for this Court to now waive the provisions of Rule 21(1) and 33 as to service of a petition and proof of service than it would be to now waive the provisions of Rule 34(2) requiring that an extension of

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[34] This is admitted. See exchange of letters between counsel reprinted in Respondent's Brief in Opposition to the Government's Petition, etc. dated March 3, 1965, Appendix thereof, pp. 20-23.

[35] "The petition is now required to be served on opposing counsel *before* it is filed (Rule 21(1)) and not within ten days thereafter, as was permitted under the former rules. Service shall be by one of the methods described in Rule 33. . . ." *Supreme Court Practice* (3rd Ed.) Stern & Gressman, p. 258.

time to petition must be sought within the original ninety day period.

If this Court may permit a party to file or serve a petition long after an extension had expired, it may likewise grant an extension long after the ninety day period has expired. That it should not do either suggests that the meaning of the statute has been construed by this Court's Rules in both cases. An opposite holding in either case would vitiate the statute and the salutary rule that litigation must at some definite point be brought to an end.

It is submitted that the petition herein should be dismissed for lack of jurisdiction and failure to comply with the statute.

B. The Government Has Reversed Its Position on a Question of Fact to Seek Reversal of the Decision the Government Induced the Lower Court To Make

Adams' Motion to Dismiss the Petition is pending before this Court. The Motion and accompanying brief were filed by Adams on May 10, 1965. The Government's Memorandum in Opposition was filed shortly thereafter. This Court has reserved decision until final hearing (Order dated June 1, 1965, 381 U. S. 931).

The issue presented is simple.

Certiorari has been granted on the basis of the Government's allegation in its petition that the equivalence of silver chloride and cuprous chloride was admitted below and that such equivalency taken together with the prior art anticipates the Adams patent (Pet. pp. 2, 6) and therefore the lower Court should be reversed. That position is reiterated in the Government's brief (pp. 7, 17, 21). However, the Government in the proceedings before the Commissioner below opposed all eight Findings of Fact proposed by Adams that silver chloride and cuprous chloride were equivalents (R. 629-33; 637-40). Thereupon the Commissioner refused to find that the substances were equivalents (R. 644-5). Adams acquiesed, and the Government did not except. The Court of Claims affirmed and accepted the Commissioner's opinion and findings of fact (R. 689).

A question of equivalence is one of fact, and a finding of equivalence is a determination of fact. *Graver* v. *Linde*, 339 U. S. 605, 609. A question of fact is not one as to which one may argue inconsistently as the Government suggests in

its Reply Memorandum of May 1965 (p. 3). The Government attempts to suggest that Adams took the position that silver chloride and cuprous chloride were equivalents only when Adams was urging the Commissioner to find infringement by reason of the Government's procurement of silver chloride batteries, and that Adams did not take the position that silver chloride and cuprous chloride were equivalents when he was urging the Commissioner to find the Adams patent valid over the prior art silver chloride patents that the Government put into the record. This is not true.

Adams presented the issue of the equivalency of silver chloride and cuprous chloride to the court in complete candor. Adams requested the court to find them to be equivalents, and either to find that the patent was invalid if the Court found that the Government's silver chloride art anticipated the patent, or to find that the patent was valid and infringed by the Government's silver chloride batteries if the Court found the Government's art not anticipatory. Adams stated in his opening to the court at R. 37-8:

> "I would like to refer briefly to the doctrine of chemical equivalents. The doctrine of chemical equivalents cuts two ways, Your Honor, as the Supreme Court has pointed out in Graver *v.* Linde. Every patent is entitled to be subjected to the doctrine of equivalents because the doctrine of equivalents is not only used to protect claims but it is used to anticipate a patent. If you find a patentee discloses compound X but compound Y is old in the art, and Y and X are equivalents, then the patent on compound X may be invalidated because of the doctrine of equivalents. So the [fol. 29] doctrine of equivalents is a two-edged sword.
>
> "We say that the Adams patent mentions only cuprous chloride specifically. Defendant has cited volumes of silver chloride references. Why? Because he is depending on the doctrine of equivalents, and he is saying that silver chloride works like cuprous chloride in this system, and if silver chloride is old, this system fails because they are equivalents and that if silver chloride water-activated batteries were invented before Adams, Defendant should win.
>
> "But having taken that position, that silver chloride anticipates, the oldest maxim in the patent book is that that which anticipates if earlier, infringes if later.

"Defendant cannot say: 'We have cited silver chloride against these batteries but you cannot use that to show it infringes.'

"He must eat the cake or leave it.

"We feel that the doctrine of equivalents should be applied here uniformly across the board.

* * *

"We also say that silver chloride is an equivalent, and, as Your Honor knows, silver chloride was used in batteries as well as magnesium, cuprous chloride and water before Adams used them. The doctrine of mechanical equivalents, and the doctrine of chemical equivalents should be applied uniformly to the patent, either with respect to anticipation or to determine the scope of the claims as to which there may be infringement, and let the chips fall where they may."

With this statement made upon the Record in open Court on the first day of trial, all the Government had to do, to be able to maintain its present position was to state that it also agreed that cuprous chloride and silver chloride were equivalents.

The Government never did this; it admits that it never took the position that silver chloride and cuprous chloride were equivalents (R. 637). It opposed all eight requested Findings of Fact of Adams that the substances were equivalents (R. 636-40).

It is submitted that the Government's decision to oppose Adams requested findings that the substances were equivalents was no inadvertence[36] for it is estimated that the Government's procurement of silver chloride batteries is 10 times in value that of its procurement of cuprous chloride batteries. The Adams patent mentions only cuprous chloride batteries and does not mention silver chloride. By opposing Adams' position that the two were equivalents, the Government persuaded the Commissioner to find that the Adams patent could not cover the Government's procurement of silver chloride batteries (Find. 28, R. 705-6,

[36] Indeed it is the clearest admission that the Government itself did not believe that its silver chloride art anticipated the Adams invention. In this respect it agreed with the subsequent evaluation of that art by both the Commissioner and the Court of Claims. (Finds. 15-21, R. 703-4)

Find. 38, R. 707-8). Thereby the Government saved itself approximately 90% of Adams' potential recovery.

Having achieved that victory by opposing all proposed Findings that cuprous chloride and silver chloride were equivalents, the Government now wishes to reverse itself on that question of fact to attack the decision of the lower Court that the Adams patent is valid. By the process of taking one position on the facts before the lower Court and an opposite position before the Supreme Court, the Government hopes to achieve a total victory in two bites.

Such intellectual acrobatics bring to mind the English aphorism—

> "Upon Thursday it was treason to cry God save King James of England, and upon Friday, high treason not to cry so."
> *The Wonderfull Yeare*, Thomas Dekker (1603)

At the trial Adams put in the record, through the testimony of Adams himself and through the testimony of his expert, all of the evidence available on the subject of the equivalency of silver chloride and cuprous chloride. Some of this evidence was favorable to the proposition (R. 41-2, 119-20, 186, 197-200, 248-50, 251-2, 256). Some was unfavorable (R. 123, 142-44, 41, 229, 263).

The Commissioner, in a detailed opinion, taking note of the fact that it was Adams' position that cuprous chloride and silver chloride were equivalents, refused to find that they were equivalents (R. 694-5). He reasoned that "The battery disclosed in the Adams patent is made up of particular components which unexpectedly produced a battery having unique characteristics" and that "the unexpectedness of the Adams invention is evidenced by the fact that, even today, the theory upon which the Adams battery operates is unknown." (R. 694-5) The Commissioner stated that "It cannot be said that one reasonably skilled in the battery art would have known of the interchangeability of cuprous chloride and silver chloride in the Adams battery" (R. 694). He therefore refused to find the two substances to be equivalents (R. 694-5), and held the Adams patent not infringed by the silver chloride batteries procured by the Government (Find. 28, R. 705, Find. 38, R. 707-8).

Thus, having won on the major issue of liability, and excised 90% of Adams potential recovery, the Government

now urges this Court that silver chloride and cuprous chloride are really equivalents in order to attack the other part of the lower Court's decision that the Adams patent is valid.

The Government says that it is arguing inconsistently because a patent may have one scope for anticipation and another for infringement, and that it has a right to be inconsistent. The Government may have a right to *argue* inconsistently, but the Government has no right to take inconsistent positions on a question of fact, particularly when one position is taken before the trier of the facts and a different position is taken before this Court in order to seek reversal of the decision of the trier of the facts that the Government itself induced him to make. And this is what it has done. The Government has said to the trier of the facts—do not find that silver chloride and cuprous chloride are equivalents—we oppose Adams in this regard. The Government now says to this Court—reverse the Commissioner and the Court of Claims because these substances are in fact equivalents. They ask this Supreme Court to find as a fact what they opposed before the Commissioner.

A leading case on the subject of reversing positions between lower and upper Courts is *Arkansas Anthracite Coal & Land Co.* v. *Stokes,* 2 F. 2d 511, 515 (8 Cir. 1924) *cert. denied* 259 U. S. 584 wherein it is well stated:

> "But it is also well-nigh universal and fundamental, as a rule of appellate procedure, that a litigant may not mend his hold on the way up to an appellate court by seeking to reverse a case, because the theory on which it was tried below, and in which appellants then acquiesced, is, in fact, erroneous. In short, to state the rule simply and baldly, the theory on which a case is tried nisi is the theory on which it must, on appeal, be weighed for error."

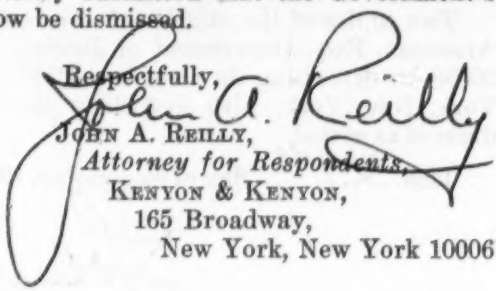
Further, as was well stated by Justice Cardozo in *Assets Realization* v. *Roth,* 226 N. Y. 370, 374, 123 N. E. 743, 744 (1919):

> "The defendant helped to induce that ruling when the result was to his advantage. We will not change it at his instance now when the result is to his detriment."

Of course, the definitive decision is that of this Court in *Davis* v. *Wakelee,* 156 U. S. 680, 689 which is cited and discussed at page 10 of Adams Motion to Dismiss of May 10, 1965.

For the above reasons and in view of the full arguments and citations contained in Adams' Motion dated May 10, 1965, it is respectfully submitted that the Government's Petition should now be dismissed.

Respectfully,



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Dated: September 25, 1965

CERTIFICATE OF SERVICE

Five copies of the foregoing Respondent's Brief were served upon the Solicitor General, Department of Justice, Washington, D.C., 20530, by depositing the same in a U. S. Post Office at New York, New York, with first-class postage pre-paid, addressed as above, and

Two copies of the said Brief were served upon Paul F. Arseneau, Esq., Department of Justice, Washington, D.C. 20530, by depositing the same in a U. S. Post Office at New York, New York, with first-class postage pre-paid, addressed as stated,

This 24th day of September, 1965.

John A. Reilly

JOHN A. REILLY
Attorney for Respondents